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AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

MARCH, 1833.

Proposed Standard of Weight and Measure. By John M. Patton, *of Milton, Pennsylvania.*

TO THE COMMITTEE ON PUBLICATIONS.

The following description of a proposed standard of weight and of measure, is at your disposal.

In the first place it will be necessary to suppose some *uniform temperature* established, at which all experiments on this subject are to be made.

Secondly, distilled water (at this established temperature,) may be considered of constant density, in vacuo.

Thirdly, from the invariable density of water, we may at all times and places ascertain the *relative* density of gold, mercury, &c. in such manner that the gold, mercury, &c. shall have a *constant relative density* to the distilled water. The words *relative density* are here used in preference to the term *specific gravity*, because the latter expression sometimes involves the idea of a pre-existing standard, which, in the present pursuit of our subject is inadmissible.

Fourthly, the elastic spring of atmospheric air is in proportion to the compressing force.

These things premised, I may now observe that if the atmosphere was, under all circumstances, of the same uniform density, the barometer would always stand at the same altitude, and hence a uniform standard would have been long since known. But the atmosphere

varies in density from many causes, and has, therefore, never been considered applicable to the establishing of a standard.

My object is to propose the means, at all times and places, of procuring a *partial atmosphere* whose density shall always be the same; and to depend on the *elasticity* of this partial atmosphere for the support of a column of mercury (of the uniform density,) at the same height. The length of this column to be taken as a *standard of measure*—subject, however, to the necessary equations, which will be hereafter mentioned.

For the purpose of pursuing this inquiry experimentally, an air pump and condensing apparatus, with suitable glass receivers of proper dimensions and strength; also, gold and mercury of the established relative densities, an accurately adjusted balance, and a glass tube of suitable length, will be required.

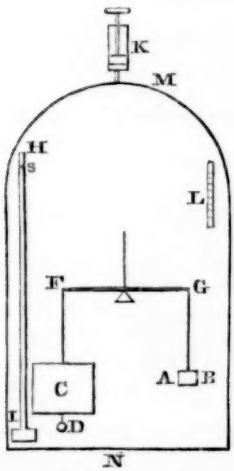
The articles mentioned being at hand, proceed in the following manner. Let any accurate cube of gold of the established relative density be made, of which let the line A B represent the side.

A _____ B

Now let a hollow glass cube be accurately made, whose side shall be ten times A B, (or, any other established multiple of A B.)

The gold and hollow glass cubes must exactly balance in vacuo. (This glass cube we will call C.)

Let a gold weight be now made, of any shape which shall be exactly equal to one hundredth or one thousandth, or any other *established* proportion of the gold cube A B, by weight, (and call it D.)



In the annexed cut,
M N is a receiver of glass.
K, a forcing pump.
F G, an accurate balance.
L, a thermometer.
A B, the gold cube.
C, the glass cube.
D, the small gold weight.
H I, the glass tube, the lower end immersed in mercury.

This tube should be filled to the common height of the barometer in the same way that barometers are filled, leaving the space above a perfect vacuum.

Before the forcing pump is applied, the glass cube will preponderate, on account of the addition of the small weight D.

The air must now be condensed by means of the pump K, until the balance is accurately restored, which will take place in consequence of the less specific gravity of the glass cube, and then we shall have the insulated or *partial atmosphere* proposed.

The height of the mercury in the tube must now be ascertained at *s*.

Thus whatever cube of gold is first assumed, if we keep up the same relative proportions throughout, we shall always obtain a partial atmosphere of the same absolute density, and whose elasticity will consequently be the same, and hence capable of supporting the same column of mercury of the same density.

A standard formed on the foregoing principles, *will vary*,

First, in different latitudes, from the variation of gravity.

Secondly, In the same latitude, from the same cause, and on account of different elevations above the level of the sea.

And it may vary,

Thirdly, on account of the gravitating power of the moon.

Fourthly, it may vary, from different states of electricity pervading the atmosphere and *possibly* affecting the elasticity of our partial atmosphere.

These are the only causes, of which I am aware, that can possibly affect our standard. The two first are real, and must be equated; the last are imaginary, but may be examined.

I would propose, that a standard obtained by the means mentioned, at the equator, and on the level of the ocean, should be esteemed a *Universal Standard of Measure*, which standard is susceptible of accurate calculation, without experimenting at the place, as the experiment of any latitude can be justly equated to any other latitude; for this purpose a table of corrections should be constructed which might extend to every minute of latitude.

I am not critically conversant in calculations of this nature, which may be left for the qualified mathematician.

Our *experimental standard* being corrected for the latitude, may be called an *approximate standard*, and will be sufficiently near the truth to lay the foundation of calculations for further corrections on account of the different elevations at which the experiment may have been made, which needs no explanation.

The next inquiry is, what influence will the moon have on our mercurial standard?

On first view, I was led to believe that this influence would be considerable, seeing that the mercury is supported in the tube by the *elastic spring* of air, and *not* by a superincumbent column of the atmosphere acting by its gravity. Calculation, however, convinces me that this influence must be inconsiderable.

The mean distance of the moon from the centre of the earth is 1,267,200,000 feet, or about sixty semidiameters of the earth. Also the force of gravity at different distances, is inversely as the squares of the distances.

The radius of the earth is 21,000,000 feet; therefore, as the square of 1,267,200,000 is to the square of 21,000,000, so is the force of gravity at the surface of the earth, to the force of gravity at the distance of the moon, viz:—

1,605,795,840,000,000,000 : 441,000,000,000,000 : : 1 : 0.000274;

so that the force of gravity at the surface of the earth, is to the force of gravity at the moon, as 1 is to 0.000274; or, as 1,000,000 to 274. The magnitude of spherical bodies is as the cubes of their radii; but the mean radius of the moon is to the mean radius of the earth nearly as 3 : 11, and $3^3 : 11^3 :: 1 : 49$ nearly. The magnitude of the earth being nearly 49 times that of the moon.

The attractive force at equal distances is as the quantity of matter, but the attractive force of the earth at the moon is represented by 0.000274, consequently the attractive force of the moon at the earth will be one-forty-ninth of 0.000274, or 0.0000056.

Thus far I have considered the earth and moon of the same density; but the quantities of matter are as the densities, the bulk being the same; and the density of the earth is to the density of the moon as $4\frac{1}{2}$ to $5\frac{1}{2}$. Hence as the density of the earth $4\frac{1}{2}$ is to the density of the moon $5\frac{1}{2}$, so is the attractive force of the moon 0.0000056 to her true attractive force, viz. 4.5 : 5.5 :: 0.0000056 : 0.0000068. That is, the attractive force of the moon exerted on bodies on the earth's surface, amounts to $\frac{68}{10000000}$ of the force of gravity on the earth's surface; in other words, it would elevate the column of mercury in tube $\frac{68}{10000000}$ of the whole column.

If this force had been greater, it would have been necessary to equate it, to suit not only the latitude of the place of experiment, but also to suit the latitude of the moon.

In the language of Nicholson, "Newton calculated the effect of the *sun's* influence in this case, (the tides,) and found it about three times less than that of the moon." This language I consider equivocal. But in the case of our standard, to place the sun and moon as much as possible out of harm's way, let *all* our experiments be made when both these luminaries are on the meridian.

The next subject is, what will be the effect of electricity? Here analogy will furnish but little light, it will have to be referred to future experiment. There is, however, a further consideration which I have intentionally avoided, I mean the *moisture of air*, which would materially affect all experiments depending on the elasticity of air. Now to render as few instruments of observation necessary as possible, I propose to dispense with the hygrometer, believing that in its most perfect construction, it is subject to much error; and on this account let the atmospheric air, to be used in experiment, be always rendered as dry as possible, by keeping it for some days in close vessels, over a large quantity of quick lime. And now to return to the electricity; this fact we do know, that the *electric states of the atmosphere* are much influenced by the quantity of moisture which it may contain, but as we shall always use it in its most dry state, we shall probably have it free from danger, from the effects of electric influence.

General Observations.

A standard of measure being thus established, there is no difficulty in determining from it a standard of weight; the principle is altogether

consistent with the foregoing, and is too well known to require explanation.

On the subject of the absolute length of the standard of measure, I have ventured no opinion; the principles proposed being general, may, *by altering the relations*, produce various lengths.

In common parlance, a pressure of about two atmospheres, would produce a standard of about five feet, which I should suppose a very suitable length, and conveniently adapted to the principles of the experiment.

One observation more, and I close the subject.

A glass cube, of the size appropriate for this experiment, (as it must be hollow, and its magnitude not less than 1000 times that of the gold cube,) would, on account of its shape, be badly calculated to resist the pressure of a single atmosphere.

To obviate this difficulty, let a cube be made of any hard substance, and of the proper size. Then take a vessel of suitable size, open at top, into which pour mercury, or water, until it stands at any height; then immerse the cube altogether in the fluid and mark the height, withdraw the cube, and immerse another glass vessel (bottle shaped) until the mercury stands at the last mark, and also somewhere on the neck of the bottle; now let the neck of the bottle be cut off where the mercury marks, this bottle shaped vessel will of course be the same size as the cube, it must balance the gold cube, which may be effected by throwing into it any substance, and then closing it hermetically, to be used in place of the cube of glass.

Reinvention of Hare's Compound Blow-pipe.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—In looking over a recent number (No. 6, third series, December, 1832,) of the "London and Edinburgh Philosophical Magazine and Journal of Science," I was struck with a paragraph, in which Mr. J. O. N. Rutter claims to have *improved Clarke's blow-pipe*, by placing the oxygen and hydrogen gases in separate reservoirs, and allowing them to unite at the orifice of the blow-pipe: in other words, he has *reinvented Hare's blow-pipe as an improvement upon Clarke's*. That there may be no misapprehension, I give the paragraph in full.

"*Notice of a new Oxy-hydrogen Blow-pipe Apparatus.*
By J. O. N. Rutter."

"I have caused to be constructed by Messrs W. & S. Jones, 30 Holborn, an apparatus which is more simple, and at the same time more effective than either Clarke's or Gurney's blow-pipe; and it possesses the additional advantage of being *perfectly safe*. The most

timid may use this instrument without the slightest danger of an explosion. With ordinary precautions, such an occurrence is absolutely impossible.

"In Clarke's and Gurney's blow-pipes it is well known that the gases are mixed in their due proportions previously to charging* the respective reservoirs. In this consists their principal cause of insecurity, to obviate which I condense the gases in separate vessels, and they are not mixed until in a state of combustion.

"Excepting that the vessels I employ are larger than ordinary, I may describe my apparatus as consisting of two of Clarke's blow-pipes, fixed parallel to each other on a mahogany slab, the jets being inclined so as to form an angle of about five degrees, and separated by a partition one-fiftieth of an inch thick. The orifices of the jets are considerably larger than those commonly used.

"The dimensions of the vessels are as follows:—That for hydrogen (marked Hyd.) ten inches long by five wide, and four deep; that for oxygen (marked Oxy.) of half the capacity of the former, viz. ten inches long, two and a half wide, and four deep. It is important that the copper vessels be made very strong: this is the greatest difficulty I have had to contend with. With a nine inch syringe I can condense from 800 to 1000 cubic inches of hydrogen gas into the largest vessel, and about half that quantity of oxygen into the vessel appropriated for it. That there can be no necessity for safety-valves, safety-tubes, wire gauge, water, or oil, or mercurial chambers, must be apparent to every one whom the present communication may concern; these are consequently dispensed with The tubes which conduct the gas from the respective vessels have each two stop cocks to regulate the escape. A very little practice enables the operator to determine the quantity so as to produce the maximum of heat.

"The usual experiments as performed by the apparatus I have thus, I fear, imperfectly described, are, if I may be allowed the use of expression, *infinitely* more splendid and more impressive than can be effected by any other means with which I am acquainted. The lime experiment especially, is inconceivably brilliant, exhibiting a disc of pure white light, one and a half inches in diameter. With a piece of clock spring I have filled an area of three feet diameter with the most beautiful corruscations.

"The advantage of this apparatus is that, if† of sufficient capacity,‡ one or two charges will be sufficient for a course of illustrative experiments in a lecture room. There is not the slightest danger of explosion. It is more powerful and more striking in its effects than any other instrument.

"I shall have great pleasure in furnishing any further details that may be required. Might not vessels of sufficient strength and capacity be constructed, in which a store of gas could be kept at the most

* In the original, *changing;* which I take to be a typographical error.
† Omitted in the original.
‡ The word *that* is repeated here in the original.

important light-houses, to be used in thick weather, in furtherance of Lieut. Drummond's plan.

"Dr. Faraday has informed me that about the time that Clarke's blow-pipe was invented, an instrument somewhat similar to mine was shown him, and was, he believes, described in the Philosophical Magazine. But that instrument consisted of one vessel only, divided by a diaphragm. Hence there was no security against an explosive mixture forming in either of the chambers, through a defect in the metal."

Lymington, Hants, September 10, 1832.

That Mr. Faraday could have been ignorant of Dr. Hare's invention cannot be supposed, much less that he should have wilfully overlooked it on this occasion. It is much more easily believed that the *inventor* has misunderstood him, and that he meant distinctly to refer the latter to the account of the original method of using hydrogen and oxygen to produce intense heat, without any danger of explosion, republished in the 14th vol. of Tilloch's Philosophical Magazine, London, 1802. How the generally clear sighted editors of the Philosophical Magazine, have permitted the insertion, as new, of what was published thirty years ago in the journal of which theirs is a continuation, seems surprising: we trust that their next number will bring upon its pages a remark explaining and excusing what must have been an inadvertence.

Of the instrument and experiments of Professor Hare, Dr. Thomas Thomson, of the University of Glasgow, speaks thus.*

"When a mixture of oxygen and hydrogen gases is set on fire, they burn with very little light, but produce a most intense heat. This mixture was first employed as a blow pipe, by Dr. Hare, of Philadelphia, about the year 1800 or 1801, and he succeeded, by means of it, in fusing some of the most refractory mineral substances.† More lately it was revived by Dr. Clark, who, at the suggestion of Mr. Newman, introduced a mixture of the two gases into Brooke's blow-pipe, and condensed them, and then set fire to the mixture issuing out of a capillary tube. The results obtained by him, were nearly the same as those which had been already made known by Dr. Hare. I contrived an oxygen and hydrogen blow-pipe in the year 1801, and made many experiments on its powers; but as almost all my results had been anticipated by Dr. Hare, I never thought it worth while to give any of them to the public."

Dr. Thomson then gives a figure of the compound blow-pipe, of a form which is very much the same with that which is commonly used in this country. It is the most simple, though not the most scientific form of the instrument,‡ and I am disposed to think it really to be,

* Thomson's System of Chemistry, seventh edition, vol. i. p. 101.

† Ann. de Chim. xlv. 113.

‡ See Hare's Chemical Compendium, p. 77. The apparatus there described, is referred to in the description as being supplied with the gases by vessels which are *not even contiguous*.

what the author in the Philosophical Magazine asserts that it is, an improvement on Clarke's compound blow-pipe. The *improvement*, however, dates in 1801, having preceded, in point of time, the *original invention* some fifteen years, and the reinvention, in 1832, can be classed only with what your editor styles

MODERN ANTIQUES.

FRANKLIN INSTITUTE.

The Committee on Inventions, appointed by the Franklin Institute, for the promotion of the Mechanic Arts, to whom was referred the consideration of the several subjects annexed, present the following reports, viz:—

On a Portable percussion Cannon Lock, or substitute for Port Fire; and an improved Cannon Lock, denominated the Compression Cannon Lock, invented by Mr. J. Shaw, of Philadelphia,

REPORT, That they are of opinion that the portable percussion lock appears to be well adapted to the purpose of discharging cannon when a failure would occur either from the permanent lock, or any of the other modes of discharge, and think it a valuable improvement in gunnery.

The compression cannon lock, from its great simplicity, and apparent certainty of action, (in connexion with his priming tubes,) appears to be all that can be desired, and if there is no practical difficulty in the way, of which the committee are not aware, they consider it the best lock that has yet been introduced, there being but little liability to get out of repair, in consequence of not having to depend upon springs of any kind, and also the facility with which it may be either made or repaired.

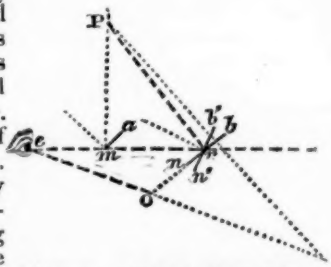
September 26, 1832.

On two reflecting instruments for measuring distances at a single observation; by Nathan Scholfield, of Montville, New London county, Connecticut.

The use of the sextant for measuring distances, by two observations at the opposite extremities of a base line, is well known. The two instruments now before the committee substitute for the measured base line and two observations, a base within the instrument and a single observation. The end to be accomplished is the measurement of the distance from the observer to any object. In principle the two instruments do not differ; the peculiar construction of each adapts it to a different use from the other, and what is gained in portability in one is lost in practical accuracy. Theoretically they are equally ingenious and correct. As a patent has been, or will be,

secured by the inventor, a brief exposition of the principle of the instruments, with special reference to the manner in which it is applied in one of them, is all that it would be proper to give at this time: this examination will show the grounds of the opinion which the committee gives in relation to the instruments.

The mirrors, *a* and *b* (see figure,) are placed in a wooden case; the first, *a*, is fixed at an angle of forty five degrees with the longitudinal axis of the tube which it enters, as far as that axis; the second, *b*, is moveable about an axis at *r*, and crosses the axis *er* of the case. There is an opening in the side of the tube in front of each mirror. When the instrument is properly placed, and the mirror *b* made parallel to *a*, the observer, in looking into the tube, sees reflected by the mirror *a*, an image of the object, the distance of which from this mirror is to be measured. When the image is made to appear on the edge, *m*, of the mirror, the line P*m* is, by the law of the reflexion of light, perpendicular to *en*, the axis of the instrument. The image of P of the other mirror, if seen at all, will appear at *o* not coinciding with *m*. By turning the mirror *b* about its axis the image will advance towards *r*, and will ultimately coincide with it; when the two images will be seen by the eye, at *e*, in the same line *er*. It may be easily shown that the angular motion of the mirror *b*, necessary to bring it into this new position *b' n'*, will be half the angle at P. The distance *mr* is, then, the base of a right angled triangle of which one of the oblique angles, viz. P, is found, and hence the side *m*P becomes known.



Note referred to at the close of the report.

* The difference of distance corresponding to any change in the angle P, may be thus found:

Call the variation in the angle P, y, the distance m P, a, and mr, b. Suppose the angle P, to become P $-$ y, and that then a becomes $a + x$, x denoting the increase of length of a, corresponding to a decrease, y, of the angle P.

By trigonometry

$$\text{tan. P} = \frac{b}{a} \text{ and}$$

$$\text{tan. (P} - y) = \frac{b}{a + x} \text{; but}$$

$$\text{tan. (P} - y) = \frac{\text{tan. P} - \text{tan. } y}{1 + \text{tan. P . tan. } y}, \text{ or by substituting for tan. P}$$

and tan. (P $-$ y) their values found above

The mirror b, is turned by a long arm extending to near e, and which is moved by a tangent screw. The angular motion is thus measured on a radius of considerable extent. In the instrument pre-

$$\frac{\frac{b}{a} - \text{tan. } y}{1 + \frac{b}{a} \cdot \text{tan. } y} \text{ or}$$

$$\frac{b}{a+x} = \frac{b-a \cdot \text{tan. } y}{a+b \cdot \text{tan. } y}, \text{ whence}$$

$$x = \frac{(a^2+b^2) \cdot \text{tan. } y}{b-a \cdot \text{tan. } y}, \text{ or}$$

$$x = \frac{a^2+b^2}{\frac{b}{\text{tan. } y} - a}$$

If, as assumed above, $b = 5$, and $y = 1$, the general equation becomes

$$x = \frac{25 + a^2}{17241.4 - a}$$

When $a = 10$, $x = \frac{125}{17231.4} = .007$.

For $a = 100$, $x = \frac{10{,}025}{17141.4} = .62$

For $a = 1000$, $x = 61.6$, and for $a = 10{,}000$, $x = 13{,}809$; which is greater than the distance a.

By assuming a limit to the accuracy required, calculation will show how the instrument may be adapted to this limit when possible. For example, let the greatest inaccuracy allowed be one foot in 100, then b and y must be so adjusted that at the greatest distance for which the instrument is to be used $x = \frac{a}{100}$

Calling this value of a, a', we shall have,

$$.01\, a' = \frac{a'^2 + b^2}{\frac{b}{\text{tan. } y} - a'}, \text{ or}$$

$b^2 - \frac{.01\, a'}{\text{tan. } y} \cdot b = -1.01\, a'^2$, an equation which must exist in order that the required accuracy may be attainable. To examine by it the machine already supposed, let us ascertain whether at 1000 feet, as the greatest distance at which it is to be used, the accuracy will be one foot in 100. In this case $a' = 1000$, b, as before, $= 5$, and tan. y = tan. $1'$. Whence $b^2 = 25$, $\frac{b}{\text{tan } y} = 17241.4$, $.01a' = 10$, and $1.01\ a'^2 = 1{,}010{,}000$. Substituting these values in the equation above, it requires

$25 - 172{,}414 = -1{,}010{,}000$, the equation is not fulfilled and the machine does not come up to the requirement. It would be easy to determine values of y and b required for all possible degrees of accuracy, and thus by the possibility of making the half divisions accurate, and by the length

sented, for examination, to the committee, there is a scale of distances applied to the arm, so that the observation being completed, the distance mP, and not the angle measured, is read off. The committee consider that greater accuracy would be attained if equal divisions, and a vernier reading, were substituted for this scale, and the distances, corresponding to the different angles, given in a table.

When the distance to be measured is considerable, the base line afforded by these instruments is too small to give results of any accuracy, but within the limits of their powers, there are cases requiring rapidity of measurement, and not accuracy, in which the committee think these instruments will be found useful.

To ascertain the extent of this power it is only necessary to remark that the distance mP is the cotangent of the angle P to the radius mr, and that when mr is given, in the particular instrument, the variations of mP may be calculated for assumed changes in the angle P, or in half that angle, as measured by the motion of the arm which turns the mirror b. Assuming the distance between the mirrors to be five feet, the angular motion of the mirror b, from its position parallel to a, or the zero of the scale, will be for 1000 feet nearly $8'\ 35''$, and for 1100 feet $7'\ 50''$, a difference of $45''$ or three-fourths of a minute for a difference in 100 feet, or ten per cent. of the first distance. If we assume that by the divisions on the scale attached to the arm, the motion of the mirror may be correctly found to half minutes; then the distance between the mirrors being taken at five

which convenience might limit, to ascertain whether the machine could be constructed to give the required degree of accuracy.

The investigation may be made more general, thus; let $\frac{a}{n}$ express the required limit of accuracy at the greatest distance for which the instrument is to be used, then at that distance $x = \frac{a}{n}$, or calling, as before, the value of a, a',

$$\frac{a'}{n} = \frac{a'^2 + b^2}{\frac{b}{\tan.\ y} - a'} \text{ whence}$$

$$b^2 - \frac{a'}{n \tan.\ y} b = -\frac{a'^2}{n} - a'^2 \quad -a'^2 \left(1 + \frac{1}{n}\right)$$

$$b = \frac{a'}{2n \tan.\ y} + \sqrt{\frac{a'^2}{4n^2 \tan.^2 y} - a'^2 \left(1 + \frac{1}{n}\right)}$$

$$b = a' \left(\frac{1 + \sqrt{1 - 4n^2 \tan.^2 y \left(1 + \frac{1}{n}\right)}}{2n \tan.\ y} \right)$$

This equation is possible when $4n \tan.^2 y\ (n+1) < 1$

feet, a change of half a minute would correspond at ten feet to .007 of a foot, at 100 feet to .62 of a foot, at 1000 feet (or .19 of a mile,) to 63 feet, and at 10,000 feet (1.9 mile,) the whole motion is but 51 seconds, and considerable variations would entirely escape detection.* (See note page 153.) The divisions, however, may be carried below the half minute.

Bibliographical Notice.

An elementary Treatise on Algebra, Theoretical and Practical, intended for the use of Students; by J. R. Young. First American edition, with additions and improvements by Samuel Ward, jr.

A treatise on algebra, bearing the above title, has lately appeared, and is now before the American public. On examining its table of contents, we find that it is not deficient in its list of subjects treated of. None of the books on algebra that have been published in this country appear to have pursued the subject farther; indeed most of them have stopped short of the limits which this author has prescribed to himself. He has placed the mark high—he has omitted no rule nor method which the judicious teacher could require to prepare his pupil for the higher branches of analysis.

We could point out a number of treatises on algebra which have been defective in this particular—treatises which give good instruction in the elements of algebra, and are quite sufficient for those who study this subject for the sake of saying they have studied algebra; yet leave the student perplexed when he attempts to study the calculus, or to apply his knowledge to useful scientific investigations. Being well pleased with the outline of the work, we come with good humour to the examination of its separate chapters. And, first, we would remark that the work bears the stamp of originality. Several of the methods of solving difficult questions are new and ingenious. Some of the theorems have been published in scientific journals, but have not hitherto found their way into any of the popular treatises.

The student who wishes to become acquainted with the science of algebra, as it exists at the present day, must study it in this book, for he can find it in no other which has issued from the American press. If he is familiar with scientific journals, or has at hand a library of the most modern European publications, and if he has taste and leisure to peruse them; if, moreover, he has judgment enough to select the useful and valuable methods of solution, to the neglect of all impracticable, obscure, and unprofitable speculations, he can dispense with the study of this book, and can from his own reading and investigation supply the defects of former treatises; if he does not possess all these means, and wishes to become a complete master of the subject, we advise him to study this work attentively, and we

pledge ourselves that he will not be disappointed. We will go farther, and pronounce our decided opinion that however excellent his talents may be, he will, if he study any other single treatise on algebra, be found, on trial of skill, to be inferior to the scholar who has faithfully studied this work.

There is another class of algebraists who do not wish to fathom the depths of the subject. They wish to be able to multiply together easy algebraic formulæ, to solve simple equations, especially if they do not contain too many fractional expressions, and consist of one unknown quantity connected with a few figures, and not perplexed with *literal* coefficients. They would be willing to study quadratic equations if all denominators and radical signs were previously exterminated.

To this class we hardly know what advice to give, though it is evident they stand most in need of advice. They are contented with little, and a little book would suffice for them. For such students it would be well to publish a small book containing some fifteen or twenty duodecimo pages.

And yet we fear that this plan would not be acceptable, for a thin book is easily seen through, and the poverty of its pages would betray the poverty of their acquirements.

This book was not written for them, still if they must study a full sized book, they cannot do better than to procure this, if the cost is not too great; for, first, they will study the best treatise extant on algebra; and who shall then say that they are not accomplished algebraists? And, secondly, they are not obliged to study all the work; and as we do not suppose this class of students to possess much judgment to select the best parts, we will here advise them to commence at the beginning and study as far as their leisure or their understanding permits; for our author has wisely arranged the rules in the order of difficulty like the steps of a ladder, one obstacle arising to view as soon as another is surmounted, and proceeding in a regular gradation to the end; the rules which are all important being placed first, and those less indispensable reserved for the close.

To conclude, we give our opinion that this is the best treatise on algebra extant. The author has embodied in it the improved methods invented during the last ten or fifteen years, and made known to the world through the scientific journals. He has not made a parade of any abstruse and useless formulæ, calculated to astonish, but not to instruct. He does not attempt to give long trains of abstract reasoning, raising new doubts, but leading to no conclusions. His illustrations are excellent, neither fatiguing by their length, nor perplexing by their conciseness; and the work is enriched with a copious list of examples for practice, many of them new, and all of them interesting, and well adapted to the rules to which they are appended.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN AUGUST, 1832.

With Remarks and Exemplifications, by the Editor.

1. For *Switches, or Turn-outs, for Rail-ways*, whereby the rail-way car, or wagon, is made to pass from one track of the rail-way to another, as occasion requires; William Howard, United States Civil Engineer, Baltimore, August 2.

(See specification.)

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2. For a *Churn;* Caleb C. Knowles, Fayette, Kennebeck county, Maine, August 2.

The common vertical churn is to be used, but the shaft, instead of working up and down, is to turn round, backwards and forwards. A frame is to be made to support the dasher shaft, vertically; on the top of the shaft is a small cog wheel, into which a segment wheel, moved by a lever, mashes, and gives the vibratory motion to the dasher shaft, the dashers being slats within the tub. Sometimes the vibratory motion is to be given by a crank attached to one of the uprights of the frame, a pitman extending from the crank to a pin on the dasher staff.

We should have thought that there was but little to claim in this affair, but the patentee has contrived to make much of it; he says,—"What I claim as my invention and improvements are the frame, the arrangement of the wheels in such a manner that the horizontal motion of the lever forward and back, turns them, and causes the dash to turn round in the cream or milk, one way, and then the other, thereby keeping it in motion; the application of the crank to procure the same motion; the perpendicular dash with floats, and a cog wheel at the upper end, and the general arrangement of the whole machinery for the purpose of making butter, as above described."

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3. For a *Spiral Pump;* Cotton Foss, Perry, Geauga county, Ohio, August 4.

This "spiral pump" is the well known screw of Archimedes; the patentee, it is true, does not pretend to claim the principle of this pump, but merely an improvement thereon; "by the extension of the arms the pump can be raised more perpendicularly without altering the wideness of the threads, and will raise twice the quantity of water, without the necessity of doubling the power."

The arms are pieces framed into the centre shaft in the manner of spokes, and are to serve as supports to the boards forming the spiral thread. The dimensions given, are, a shaft twenty inches in diameter, and sixteen feet long. The spiral groove formed round this, is to have a space of two feet between each turn. The arms or spokes supporting the spiral, are to be three feet eight inches long. The inclination to be given to the screw is to be such that the horizontal

surface of the water will extend from the top of one spiral, next the shaft, to the bottom of that next above it, on the rim. The screw is to be made to revolve by a bevel geared wheel at the upper end of the shaft. Something will be gained in point of friction by enlarging the dimensions, but not much; to raise double the quantity of water, must therefore require, very nearly, double power to be applied.

We do not perceive the novelty upon which the claim is founded, as, according to our understanding of the thing, it simply amounts to saying that "I make the screw of Archimedes larger in diameter than usual, and place it more vertical than it is ordinarily placed." Now we are not acquainted with any rule limiting the diameter, or the inclination of this instrument, the relationship which one must necessarily bear to the other having been well understood from the epoch of its invention to the present day.

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4. For an *Inclined Water Wheel;* Cotton Foss, Perry, Geauga county, Ohio, August 4.

The water wheel described in the specification of this patent, is intended for a tide and current wheel. It consists of a shaft inclined from the perpendicular in any required degree, and capable of having this inclination raised by sliding blocks, or beams, in which its gudgeons run. The floats, or buckets, are formed like oars, and are attached to arms forming radii with the shaft. The claim made is to "the inclined water wheel as herein described; also the moveable sill on which it stands, and the sliding beam which is moveable in the said plates."

The wheel is to be fixed in proper frame work by the water side, or it may be moored in the water, or otherwise placed, so as to answer the intended purpose. In what it is superior to numerous other tide and current wheels, we are not informed, nor are we able to discover; and, as at present impressed, should prefer the ordinary vertical wheel, made in the manner of the common undershot.

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5. For an improvement in *Percussion Fire Arms;* James B. Porter, Gerrard, Schuylkill county, Pennsylvania, August 4.

The contrivance presented to us in this patent consists of a mode of firing two or more charges in succession, without stopping to reload the piece. When there are to be two loads, there must be two nipples to receive the percussion caps, one in the usual place, and the other about two inches in advance of it. A load, with its ball, is to be rammed down, and is to extend nearly to the touch hole of the further cap; a second load is then to be rammed down in the same way as the former. The hammer is double, one part of it reaching over to this last cap, and the other strikes on that cap which is near the breech; this last hammer works upon a joint, and is capable of being moved out of the way. When the gun is to be fired, a cap is placed upon the further nipple, and the discharge made; a cap is then to be placed upon the other nipple, the secondary hammer brought down to

its place, and the second load discharged. The claim is to the described mode of effecting this object.

Percussion powder is rather an insinuating material, and, waiving all other objections, we think that the gunner would sometimes be saved the trouble and cost of placing a cap upon the second nipple, although he might need one upon his own, as there would be no small danger of bursting the gun by the explosion of its double charge. If it is designed to use this contrivance on fowling pieces, we believe that there are few sportsmen who would not prefer the double barrelled gun, even if the danger we have stated should not exist.

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6. For an improvement in the *Pegging Machine;* William B. Randall, Fayette, Kennebeck county, Maine, August 6.

The description and drawing of this machine are undoubtedly clear to the inventor, but they convey to us but a very confused notion of it; perhaps by much study and application they might enable us to invent a machine somewhat similar, but we should have first to learn all about former modes of procedure in this business, and as we have affairs of higher interest, to ourselves at least, which demand attention, we must, however reluctantly, leave our readers in the same state of darkness, as regards this pegging machine, in which we are involved.

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7. For a *Double Power Hydrostatic Oil Press;* Orestes Badger, and Orris Lull, Otsego, Otsego county, New York, August 9.

The general principle upon which this press operates, is that of Bramah's hydrostatic press, but the cylinder is placed horizontally, instead of vertically, and it has two pistons instead of one, the cylinder being open at both ends.

A strong frame is made, in the form of a trough; it may be formed altogether of iron, or of wood and iron combined; in the middle of this trough the cylinder is placed, with its two pistons leathered in the usual way. The forcing pumps for injecting water resemble those now in use; the water from them is injected into the middle of the cylinder, and acts equally upon each piston. The seeds or other articles to be pressed are placed in vessels properly constructed, one of which is put in at each end of the trough. When the pump is worked, the pistons operate equally upon these vessels, and press the contained oil from the seeds in each.

The specification gives a very full description of the apparatus, and closes with the following claim.

"The petitioners claim to be the inventors of the improvement of laying the cylinder horizontal, and of working the pistons out of both ends; and of the frame, and laying it also horizontal, and finally, of the whole construction of the frame, the pistons, and construction of the cylinder; the introduction of the water into the middle of the cylinder; the safety valves; and finally, the whole construction of the press, and application of it to the purposes of extracting oil from flax seed, and other vegetable substances. The petitioners do not claim

to be the inventors of the principle of creating a pressure by the injection of water into a cylinder, it having been used before for an upright press, with one piston rising upwards; but the petitioners do verily believe that they are, and claim to be, the inventors of the machine in its present shape, and the application of the same as described in the specification."

We apprehend from the title of a "double power hydrostatic oil press," that the patentees suppose they double their power by pressing at both ends; but whilst action and reaction are equal, such cannot be the case; an error of this kind is, however, one of very frequent occurrence; still, a little reflection must render it apparent, that when a given quantity of water is injected into this new press, it can move each of the two pistons to but one-half of the distance to which a single piston would be removed by it. Apart from this, however, we think the claim is much too broad; the employment of the two pistons we believe to be new, and whatever advantage may result from the use of them would, in this case, belong fairly to the patentees; but the placing the cylinder horizontally, would not, if new, alter the nature of the press; and it is not new; in Bramah's own manufactory, he has used his cylinder horizontally, having employed it instead of a screw to a vice, in which articles were to be held with great force. "The whole construction of the press," as used by the patentees, may with more truth be said to be old than new; for although the two pistons, and some other particulars named, might be legitimately claimed, the general construction is no further changed than was necessary to the position of the cylinder. We think that the common error of patentees, the claiming too much, has been manifestly committed in the present instance.

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8. For a *Current and Tide Water Wheel;* James Bennet, Vigo county, Indiana, August 10.

A water wheel with floats made in the usual way, is to have its gudgeons run in head blocks placed between uprights which admit of their sliding up and down by the aid of chains or racks, operated upon by suitable machinery. The contrivance has undoubtedly been made without a knowledge of what has been already done, as the whole is very inferior in point of arrangement to structures of a similar kind which have repeatedly been carried into effect, although with but little advantage. The specification does not pretend to claim any thing as new.

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9. For a *Brick Press;* David M. Crellis, Sandwich, Strafford county, New Hampshire, August 11.

This, like the pegging machine, described a page or two back, however good it may be, has its qualities hidden behind a thick veil of bad authorship, and we are very apprehensive that our best machinists would be puzzled in the attempt to make the instrument from the specification and drawing alone. Perhaps the model might remove the difficulty, but as this makes no part of the patent, we do

not resort to it for the information which we publish, being determined not to promote the prevailing error on this point. If the specification and drawing taken together do not make the invention known, they are essentially bad.

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10. For an improvement in *Saws;* Stephen Ustick, city of Washington, District of Columbia, August 11.

The proposed improvement in saws consists in giving to a certain portion of the teeth a form different from that which they usually receive, which teeth the patentee calls "side cutters." The other teeth of the saw, say five or six in succession, are to be of the ordinary shape. The side cutters, instead of being pointed, are round at their ends, and filed to a sharp edge; they are to be a little longer than the other teeth, and are to be set alternately on each side of the saw. It is intended that their cutting edges shall clear the sides of the stuff, and make smooth work; in order to this, they must be so set as to be perfectly parallel to the sides of the saw. The improvement is said to consist in the form of these rounding teeth, and in the setting them in the way described.

There are but few workmen who are able to sharpen and set a saw really well; it is in fact a very nice job to any one but the saw maker who is constantly employed at it. To sharpen and set a saw in the manner described, will be a task of still greater difficulty, and one, we think, that will rarely be undertaken, however well such a saw may be found to work when perfectly set. To keep the side cutters a little longer than the common teeth will not be a very easy thing, as their substance will be less. We might urge other objections, but they will be so obvious to the workman, as to deter him from leaving the beaten track.

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11. For an improvement in the *Mode of manufacturing Spoons out of Pewter, or other soft metal;* Charles Goodyear, city of Philadelphia, August 11.

Pewter spoons, as commonly made, are weak in the handle, and are very liable to break off near the bowl. To prevent this the patentee casts the handle and the bowl in separate moulds, the bowl, however, having about half an inch of the intended handle cast with it; this short piece is cast upon a wire, which, when removed, leaves a hole along the centre of it. The handle is cast with a flat piece of iron or steel wire extending its whole length, and projecting about half an inch from the end which is to join on to the bowl. This projecting piece is passed into the piece formerly mentioned, when the two are soldered together, and the juncture filed and finished in the usual way.

The claim is to the casting the spoon in two parts, and to the strengthening it by means of the flat pieces of iron or steel wire.

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12. For a *Plough;* John Moore, Cyntheana, Harrison county, Kentucky, August 17.

In this plough the mould board is to be entirely of wrought iron, and the share and mould board in one single piece. A piece of steel, welded upon the cutting edge, is to take the place of the ordinary coulter; this mode of construction forms one part of the claim; another consists in the mode of attaching the mould board and land side to the beam by means of a screw bolt, with a nut both above and below the beam, the object of which is to set the plough so as to take a greater or less hold in ploughing, &c. &c.

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13. For a *Plough;* George W. Palmer, Jefferson, Richland county, Ohio, August 17.

This plough is to be made in part of wood, in part of iron, and in part of steel; the iron being intended to strengthen the wood, and the steel to give all reasonable durability to the iron. In the picture this plough preserves the usual features of such articles, and whatever of invention there may be in it, the patentee claims none, leaving it to the sagacity of others to discover wherein it consists.

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14. For a *Plough;* John Weaver, Brownsville, Fayette county, Pennsylvania, August 17.

The plough as here presented to us certainly assumes the appearance of considerable novelty in form. The leading principle, the patentee says, is a means of moving the beam of a plough on the sheath or frame to which the shoe, share, and coulter, are attached. There is a considerable number of figures intended to illustrate this mode, which, as it is complex, could not be understood from verbal description.

It is observed that the same plough will not answer both in a light soil, and in stiff sward, and clayey land; the cause of which, the patentee claims, after much study, to have discovered; and it consists in "the different pressure of different soils on the mould board." This difficulty he obviates entirely by moving the beam, and thus regulating the pressure of the soil, in all its varieties on the mould board. "This he thinks the greatest discovery ever made in that useful implement."

There are ten points, or parts, particularly enumerated and claimed as new. The first of these is "the moving beam as applied to single and hill side ploughs;" and the other nine points consist, principally, in the individual parts by the combined action of which this is effected. Should it appear, however, that the moving beam is itself not new, and we have described many ploughs with moving beams, the nine accessories will scarcely support the superstructure.

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15. For a *Bedstead;* Henry Reisinger, York, York county, Pennsylvania, August 18.

This is intended for an invalid bedstead, and is so constructed that by the turning of a windlass, one end of it can be raised, or lowered. There is no novelty whatever in the means by which this is to be effected, whilst a number of movements and conveniences not at-

tempted in this bedstead, have, in addition to the mode of raising and lowering, been accomplished in others, several of which we have had occasion to notice. There is a drawing of the plan, but it is without the written references which are required by law.

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16. For improvements in *Water Wheels and Saw Mills;* Charles Forse, Boonville, Cooper county, Missouri, August 24.

The specification of this patent is a very formidable affair, extending over twenty-one pages of foolscap, of which we shall give but little more than the claims, referring those who are particularly interested upon the subject, to the patent office, as we could not furnish a sufficient illustration of it without the drawings.

"CLAIM. What I claim as new, and as my own discovery and invention in the above described water wheels, and saw mill, and for the use of which I ask an exclusive privilege, is as follows, viz.

"*The Flutter Wheel.* I claim as new, and as my discovery, the making use of flutter wheels of a less diameter, nearly one-third, than Evans' plan requires for a like head, or the practice of any millwright I have ever known. I also claim as new, and as my discovery, the location of said flutter wheel as before described, and also the formation of the chute and trunk as before described, and the covering of the wheel, the application and discharge of the water in such a manner that the wheel is capable of running under water."

"I claim as new, and as my discovery, that part of the gearing apparatus before described, which relates to the opening and shutting of the main water gate by the power of water, or other parts of the mill when in operation."

"I claim as new, and as my discovery, that part of the gearing apparatus before described, which relates to the opening and shutting of the tub wheel water gates, and to the running back works, as operated upon by water power or other parts of the mill."

"I claim as new, and as my discovery, that part of the gearing apparatus relating to the feeding hands, as is operated upon by water power, also by steam power or any other power."

"I claim as new, and as my discovery, that part of the gearing apparatus related to the setting out of the tail end of the log, and also for setting out the log for work at the opposite or head end, as operated upon by water, or other parts of the mill, or by steam power, or any other power."

"I claim as new, and as my discovery, that part of the gearing apparatus related to the fastening and loosening of the dogs, as operated upon by water power, steam, or other power."

We are informed that the improvements which form the subject of this patent have been in actual operation for a considerable length of time, and that they answer the intended purpose. The patentee avers, that a mill constructed upon his plan performs fifty per cent. more work than the ordinary mills.

Although we are not prepared to admit these statements to the full extent, we are convinced, from a careful examination of the model,

as well as of the specification and drawings, that the business of the saw mill is much facilitated by the operation of some parts of the machinery employed by the patentee.

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17. For a *Machine for Hulling and Cleaning Grain;* Orris Lull, Otsego, Otsego county, New York, August 25.

A cast iron cylinder is made of about three or four feet in length, and from twenty to twenty-four inches in diameter; the inside of it is to have angular ridges running from end to end, so formed that a transverse section would exhibit an appearance something like saw teeth. This cylinder is to be supported horizontally upon a suitable frame, and is to have heads of wood or iron, secured to flanches prepared for that purpose. Within this cylinder beaters are made to revolve, making six or eight hundred revolutions in a minute. The beaters consist of plates of iron set edgewise; they may be six in number, are sustained by heads fixed upon a revolving shaft, and are set spirally, so as to deviate, in their whole length, about two inches from parallelism with the axis; they stand at the distance of about an inch from the inner surface of the cylinder. The grain is introduced through an opening at one end, and falls out at a small opening on the lower side of the cylinder at its opposite end. At this end there is another opening through the head of the outer cylinder, near its upper side, through which the smut and other dirt is blown, it being enclosed by a trunk which conducts the dirt away.

The beaters serve to throw the grain perpetually against the ridges within the cylinder, whilst by their spiral form they gradually carry it forward, and at the same time create a wind by which the dirt and chaff are discharged.

The claim is to the cast iron horizontal cylinder, and the revolving iron spiral beater.

The machine appears to be well calculated for the intended purpose, but the directions given for its construction, and the form in which the claim is made, would seem to limit the inventor within very narrow bounds.

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18. For *Diaphoretic or Sweating Powders;* Horton Howard, Columbus, Franklin county, Ohio, August 25.

These powders are to be employed in cases of slight indisposition, where it is desirable to induce perspiration. They are prepared as follows:—

Butterfly root, (*Asclepias Tubarosa,*)	1 pound.
Bark of bayberry root (*Myrica Cerifera,*)	1 "
Ginger,	1 "
Bark of sassafras root, (*Laurus Sassafras,*)	4 ounces.
Colic root, (*Liatris Dubia,*)	4 "
Cloves and cayenne, each	2 "

These materials are to be finely pulverized and sifted; the dose prescribed for an adult is a tea-spoonful in hot water, with sugar, if preferred.

We are informed that this combination of stimulants, with tonics, increases the vital force, whilst it gives tone to the organs.

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19. For a *Bitter Tonic;* Horton Howard, Columbus, Franklin county, Ohio, August 25.

The recipe is—

Poplar bark, (*Populus Trepida,*)	1 pound.
Root of golden seal, (*Hydrastus Canadensis,*)	1 "
Bark of the root of bayberry, (*Myrica Cerifera,*)	1 "
Root of American columbo, (*Fracera Verticillata,*)	1 "
Cloves and capsicum, each	6 ounces.
Loaf sugar,	4 pounds.

These are to be pulverized, mixed, and given in water, a tea-spoonful being a dose.

To render the bitters laxative, a pound of bitter root, (*Apocynum Androsaemifolium,*) is to be added, with a proportionate increase of the cloves, capsicum, and sugar.

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20. For an *Astringant Tonic;* Horton Howard, Columbus, Franklin county, Ohio, August 25.

This medicine is to be employed in relaxations of the intestines, in hæmorrages, in canker, ulcers, putrid disorders, and fevers, but not when attended by costiveness, thirst, and much heat.

Brith root, (*Trillium Catifolium;*) plurisy root, (*Asclepias Tuberosa;*) Bark of the root of bayberry, (*Myrica Cerefera;*) inner bark of hemlock, (*Pinus Canadensis;*) are to be taken in equal parts; when pulverized and mixed, an ounce of the compound powder is to be steeped in a pint and a half of water. The dose is to be half a tea-cupful, with the addition of from one-half to a whole tea-spoonful of cayenne. In ordinary cases it may be taken three times a day; but in diarrhœa, &c. more frequently.

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21. For *Compound Tincture of Myrrh;* Horton Howard, Columbus, Franklin county, Ohio, August 25.

The recipe is—

Myrrh,	12 ounces.
Capsicum, (*Annuum,*)	2 "
Balsam of fir, (*Pinus Balsamea,*)	1 "
Nutmegs,	½ "
Brandy,	1 gallon.

Pulverize the solid articles, and steep them in the brandy for ten days, shaking frequently, and strain.

This, we are informed, is a very powerful antiseptic, and should be taken in all cases where internal mortification is apprehended, and in putrid diseases. It is also to be administered for worms, pains in the stomach, colic, headach, &c. &c. Dose, from one to four tea-spoonsful. It is also to be employed to bathe fresh wounds, and to be rubbed on the parts affected by rheumatism, or other obstinate pains.

22. For *Antispasmodic Tincture;* Horton Howard, Columbus, Franklin county, Ohio, August 25.

To prepare this tincture, take

Tincture of lobelia seeds, (*Lobelia Inflata,*)	1 pint.
Tincture of capsicum, (*Capsicum Annuum,*)	1 "
Nervine tincture,	3 gills.

Of these, when mixed, the dose is from half a tea-spoonful, to a table-spoonful.

It is to be used not only in cases of fits, spasms, &c. but in *all violent attacks of disease;* and in cases of apparent death from hanging, drowning, lightning, &c.

The tincture of lobelia seeds is to be prepared by digesting four and a half ounces of the seeds in a pint of alcohol for ten days. The tincture of capsicum, in the same way, using the same proportions. The nervine tincture by taking a powder composed of four ounces of lady's slipper, (*Cyprependium Luteum,*) of ginseng, (*Panax Quinquafolium,*) two ounces; with two nutmegs, and steeping it for ten days in alcohol, or brandy; to this, when strained, an ounce of essence of anine is to be added; this essence may be formed by mixing two ounces of the oil of anine in a pint of alcohol.

The patentee, in the five preceding patents, has almost given us a vegetable pharmacopœia, upon which we think it unnecessary to offer many remarks. Most of the medicines are good, if administered at the right time, and the same may be said of nearly all quack medicines, even those among them which are virulent poisons. There is nothing new, however, in either of them, excepting the exact proportions given in the recipe, and the patentee can secure nothing but the right of mixing them in the precise quantities indicated; this, to him, it is true, is a point of little or no importance; if he can contrive to make them popular they will sell, and he will make money by them; and this, of course, is the motive for procuring patents for them.

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23. For *Raising Water from the Interior of the Earth;* Levi Disbrow, and John L. Sullivan, city of New York, August 28.

(See description with specification.)

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24. For a *Machine for Hulling, Cleaning, and Polishing Barley, Rice, Broom Corn, &c.;* Theodore F. Strong, and Marcus T. Moody, Northampton, Hampshire county, Massachusetts, August 29.

Two disks are to be made in the form of mill stones, and are to operate in the same way; the upper one is to be of cast iron, to give it weight, but it is to be faced on the lower side with wood. The lower is to be of wood entirely. These disks are to be faced with strong card teeth, set in leather, or other elastic substance, and the grain to be hulled, &c. is supplied as to ordinary mill stones. From between these it passes into a winnowing machine, where the chaff and dirt are blown off, and the clean grain is conducted by a trough

through the eye of the upper of another pair of disks similar to the former, but faced with finer materials, as with bristles, hair, or dog-fish skin; after which it passes into a second winnowing machine, which completes the operation.

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25. For a *Portable Cooking Stove;* Stephen J. Gold, Cornwall county, Connecticut, August 29.

The claim made by this inventor is to what he calls "the diamond form of the stove, and the portable oven in two parts, to be used on this stove, or any other, as a dark oven." There does not, however, appear to be any thing in it, either in form or substance, worthy of particular notice, or commendation. The stove part is similar to most other cast or sheet iron stoves, and it has an opening through the top on which to place a pot or kettle. The top plate of the stove extends back of the main body, is double, and has three perforations in it, for skillets, pots, &c. and these four openings give to the outline of the top, the "diamond form" which constitutes the first claim. The "portable oven" is a box, shutting up, which may be placed over the three back openings, instead of the other utensils. There is a flue at the back end to carry off the smoke.

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26. For an improvement in the mode of *Preparing Fomentations used in cases of Sickness;* Timothy L. Jennison, Cambridge, Middlesex county, Massachusetts, August 30.

The main apparatus, or implement to be employed, the patentee denominates a *foveat*, which is to be substituted for the woollen, or other cloths, generally used in fomenting with decoctions of aromatic herbs, or other articles. The foveat is to be made of silk, cotton, linen, or other suitable cloth, and may be about half a yard square. Two pieces may first have lambs-wool batting quilted in between them; a similar piece laid upon this is then to be run, or stitched to it in the manner of the old fashioned housewife, leaving parallel spaces which would admit a round stick of an inch in diameter. The stitching is to be done in double rows, leaving a space of a third of an inch between each of the larger cavities. These large cavities are to be stuffed with the aromatic herbs, &c. by means of a funnel and rod, prepared for the purpose. When thus prepared it is to be dipped into boiling water, and then placed between two boards, which are hinged together at one edge, and is called a compressor; between these it is to be squeezed sufficiently dry, and then applied to its intended purpose. The whole apparatus is claimed as new.

The specification contains remarks upon the mode pursued "during the past century," and upon the great superiority of this apparatus and procedure, with particular directions for its use, which we do not think it necessary to copy. We do not dispute the goodness of the contrivance, but its employment will be principally confined to hospitals, and other institutions of a similar character, from which we do not expect, and scarcely wish, that the patentee should realize

a fortune. Such establishments as these give freely, and should freely receive.

LIST OF AMERICAN PATENTS WHICH ISSUED IN SEPTEMBER, 1832.

With Remarks and Exemplifications, by the Editor.

1. For an improvement in the mode of *Sizing Paper by Machinery;* John Ames, Springfield, Hampden county, Massachusetts, September 1.

(See specification.)

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2. For a *Pulp Dresser,* for dressing pulp in the manufacture of paper; John Ames, Springfield, Hampden county, Massachusetts, September 1.

(See specification.)

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3. For a *Wedge Press;* Oliver Perkins, Oxford, Oxford county, Maine, September 1.

This press, we are told, is to be used for pressing cloth, paper, books, spermaceti, &c. &c. or for raising pondrous bodies, as the extraction of stumps, &c. Upon the follower of the press there is a friction roller, the gudgeons of which work in boxes on the upper side of the said follower. An iron shaft crosses the press above the follower, extending from cheek to cheek, and turning upon gudgeons; one of these gudgeons passes through the cheek, and carries a toothed wheel; a pinion taking into this toothed wheel, and turned by a crank, gives the required revolution to the shaft. A wedge is to be made, the thickness of which at its back, should be equal to the intended descent of the follower, and its length must be proportioned to its thickness. This wedge is to pass in between the friction roller upon the follower, and the iron shaft, which forms the antagonist roller. Two chains, one on each side of the wedge, are to be attached by one edge to the wedge, and by the other to the iron shaft, when by turning the crank upon the pinion, the wedge will be drawn in between the rollers, and force the follower down.

Inclined timbers are placed to support the wedge on each side, acting as rail-ways to it; the wedge having truck rollers on them which rest upon the ways.

There is no claim made, the whole arrangement, we suppose, being considered as new.

A wedge drawn in, in this way, will certainly offer much less resistance from friction, than the screw; the chain winding upon a shaft, however, seems to us to be an incommodious way of drawing in the wedge. A rack and pinion we should think preferable. The method proposed is the same in principle with that of the press having

one or two eccentric rollers turned by a wheel and pinion; but the friction in this case is much less than that of the wedge with its chains, and, besides this, there is no wedge in the way.

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4. For an improvement in the *Reacting Water Wheel;* Geo. W. Henderson, and Joseph Russell, Wilburn, Somerset county, Maine, September 2.

The form of this water wheel is that patented by Mr. Wing, and described vol. vii. p. 86. This wheel, however, in its general principle and construction, has been more than once described, although imperfectly, in previous specifications. One of the present patentees, Mr. Geo. W. Henderson, and a Mr. John E. Cayford, obtained a patent for a reaction wheel with an open head, running against the bottom of a penstock, on the 14th of April, 1850. This, however, was specially described as not having the floats to lap over each other; each, if there were six, being one-sixth of the circumference of the wheel in length, whilst in Wing's there is a special claim to their lapping over each other. The only novelty in either case must be special, as the general construction is much older than either of the patents. These remarks may appear to be somewhat irrelevant, but they are not so, as they apply to existing feelings, and clashing interests among several different patentees, respecting which we have received divers appeals. Patentees seem very apt to imagine that those parts of a machine which are old do, in fact, belong to them merely because they have added some new feature to it; but should they go into court, this lesson will soon be placed in their hands, and they will not be allowed to skip over it.

The main claim of the present patent is the making the floats adjustable, for which purpose they are cast in separate pieces, and a pin, or gudgeon, is cast on each edge of each of the floats, which pins pass into corresponding holes in the rims; a screw and nut is used to fix them in the required position. This adjustment of the floats, by which the openings are enlarged or diminished, the patentees deem to be a great improvement, as by its means the flow of water can be lessened, when part of the machinery is put out of gear, or increased when more is added.

That considerable advantage may be derived from this adjustment, we do not doubt, although the theory of the patentees, that "the power of a reacting wheel is in proportion to the quantity of water discharged," is one which we cannot admit as true. If they open their buckets so as to make them nearly radii to the wheel, they will soon abandon this opinion. To have the maximum effect, the water must be delivered nearly tangentically, and if the floats are opened so as to deliver it otherwise, there will be a proportionate loss of power, and a consequent waste of water. We think that all the advantage derived from lessening the apertures in the present wheel, would be obtained by closing a certain number of openings in the wheel with fixed floats, as used by Mr. Wing.

To prevent the necessity for the *lighter* as used by Wing, the pa-

tentees say that the water is to rest upon the bottom of the floom, or cistern, " which removes the cause of the gudgeons wearing down."

The claim is to the " making the reacting water wheel alterable, and open, for the water to rest on a plane or bottom of a floom, or cistern, instead of the wheel."

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5. For a *Corn Sheller;* Christian Thomas, Conestoga, Lancaster county, Pennsylvania, September 3.

This is certainly a new, if not an improved, form of the corn sheller. A plank, about eighteen inches long, and a foot wide, is fixed so as to slide up and down in grooves made in two uprights; on one face of this plank a cast iron plate is screwed, which is grooved across from side to side, the grooves running somewhat diagonally; a cast iron cylinder, about four inches in diameter, and grooved from end to end, is fixed so as to turn upon gudgeons in front of the slider. The slider is to be worked up and down by means of a lever attached to the back of it by a jointed rod, the lever at the same time working a segment which causes the iron cylinder to revolve as the slider descends. The corn to be shelled is placed in the space between the iron roller and the slider, a small intermediate roller supporting the cob, which rolls off, over the top of the slider, when it is down at its lowest point.

The inventor, we presume, wanted a patent more than the public needed a corn sheller, as those already in use are, at least, as perfect in their operation as this new one can be, and will shell corn more quickly than one in which a slider must travel the distance of three feet for every ear that is shelled.

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6. For a *Water Wheel for Propelling Mills, Boats, and other Machinery;* Davidson Myers, Benton, Scott county, Missouri, September 3.

This consists of endless chains passing over rollers at each end of a frame, and carrying buckets, or floats, horizontally through the water, in a way which has been often tried, and which was in the beginning, is now, and ever shall be, found good for nothing.

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7. For an *Improvement upon the Rail-way Car Gold Riddle;* Oscar Willis, Burke county, North Carolina, September 5.

The rail-way car gold riddle, is described in a former number. The improvement now patented consists in suspending a riddle by four chains, attached above to proper frame work. The bottom of the riddle is to be of sheet iron, and perforated with numerous holes. Below the riddle is a hopper into which the siftings and water pass, and from which it falls into a ripple, furnished with ledges, in the usual manner. The riddle, by being swung backward and forward, gives, it is said, a peculiar action, which is similar to that of the "rail-way car gold riddle," upon the inclined planes.

8. For a *Rotary Grate and Floor, for Burning Anthracite Coal;* Eliphalet Nott, Schenectady, state of New York. First patented March 23d, 1826. Surrendered, cancelled and reissued upon an amended specification, September 17, 1832.

The patentee states that he has discovered that the ashes which attach themselves to the lower surface of the lower stratum of anthracite coal, or other fuel, can, to a considerable extent, be detached therefrom by means of a revolving grate; and that he has also discovered that the bars of grates last longer, the thinner they are, and that they break less frequently when they are connected together; he has been thereby led to the construction of his rotary grate, which forms the subject of this patent.

The rotary grate may consist of circular cast iron flat rings, which may be about an inch in width, and three-eighths of an inch in thickness. Upon one of the flat sides of each of these, small projecting knobs may be cast, which serve to keep the rings apart, and to regulate their distance from each other. These rings have arms attaching them to a centre, which is perforated to receive an axis by which they are all connected together. Rods may also pass through their rims for the same purpose. These rings are to be put together in such numbers as shall form a cylinder equal in length to that of the chamber in which the fire is to be made, and must be of such diameter as shall nearly fill its capacity in depth. The axis is to pass through the wall of the fire chamber, and is to receive a crank, or handle, by which it may be turned. The fuel is to be placed above this revolving cylindrical cage, or grate, and when it is desirable to remove the ashes, the grate is made to revolve a short distance in one, and then in the opposite direction, by means of the handle, or crank.

Instead of making the rings entire, they sometimes form segments only, say of about two-thirds, of a circle. When these are put together in the manner described, they constitute a longitudinal segment of a cylinder; the continuous part of the cylinder is to support the fire, in the way before described, and the ashes are also to be discharged by vibrating it, as with the entire cylinder; but it is likewise used to discharge the whole of the fuel, when required, and to drop it into the ash pit. This is effected by turning it round so that the side where the rings are not continued, comes under the fuel, which then falls into it, as into a basket; by then turning it round so that this open side of the cylindrical segment may be over the ash pit, the fuel is discharged.

Some variations of form and construction are described by the patentee, but the foregoing exhibits the leading feature of the invention, which will further appear by the claim, which is as follows:—

"I claim as my improvement the rotary grate and floor aforesaid, when employed in the evolution and management of heat, whatever the construction thereof, or however the same may be adjusted.

"In like manner I claim the full length horizontal axis aforesaid, (irrespective of its connexion with the grate aforesaid,) together with its adjustment in a chamber of combustion for rotary motion; should it be, as it admits of being, so adjusted by itself in the floor of such

a chamber, for the purpose of sustaining the fuel, or detaching ashes therefrom, or passing down the same when detached.

"In like manner, I claim the combination of the said rotary grate with said axis, and the adjustment of the two as connected in a chamber of combustion as aforesaid; together with the uses thereof when so combined, as the same are hereinbefore set forth; together with such other uses as said instrument may be applied to hereafter, in the evolution or management of heat."

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9. For improvements in the *Anthracite Coal Stove*, rendering combustion therein more uniform, and more intense, by the uniform supply of coal and air which have been previously heated; Eliphalet Nott, Schenectady, State of New York. First patented March 26th, 1828. Surrendered, cancelled, and reissued upon an amended specification, September 17, 1832.

This stove is generally made of cast iron; it may be round, but a square form is preferred. The stove is to be lined with fire brick, and in one, the chamber of which measures eight inches on the side, the whole height may be about thirty-three inches. A grate may be placed in it at about seven inches from the ash pit, and the part above this forms "the chamber of combustion," and a receptacle for fuel which is heating, but not undergoing combustion.

Instead of the grate commonly used in such stoves, the rotary grate, described in the last article, may be employed to greater advantage. The part below this grate forms the ash pit, and is also the chamber in which the air is to be heated, preparatory to its entering among the fuel; the ash pit may be furnished with a valve. In this part we do not discover any new provision for heating the air, as its construction appears to be precisely the same as that of numerous other stoves; there may, however, be something which we have overlooked.

The chamber, above the grate, is divided into two parts by a vertical partition, which descends from the top, to the distance, probably, of ten inches or a foot. This partition divides the upper chamber into two unequal parts; it may stand at about two inches from the back lining of the stove, and if it is itself two inches thick, it will, of course, leave a compartment in front of four inches by eight. The back space forms the flue, which is surmounted by a suitable pipe, whilst the front forms the reservoir for extra fuel. This part has a cover, which is to be lifted off for the supply of fresh fuel.

Suppose the whole of the chamber, with the exception of the flue, to be filled with fuel, and the fire lighted; the draft of air will extend no higher than to the lower part of the vertical partition, and rapid combustion will thus be limited to the fuel in the lower part of the chamber; ignition, however, will extend to a still greater height, and the whole of the spare fuel will be heated by radiation, and the ascent of heated air. The quantity of fuel requisite for the whole day may be thus supplied at once. Besides the cover, before mentioned, a plate of iron half an inch thick, and fitting the spare fuel chamber,

but so loosely as to slide down in it, is placed upon the fuel; this is called a follower.

The front plate of the stove is generally perforated, the opening being opposite to the lower part of the vertical portion. This opening has a lattice-work door, fitting closely, the lattices being covered by lamina of mica, (isinglass,) which excludes the air, but allows the fire to be seen.

When it is wished to apply the heat of such a stove to the heating of iron bars, or other similar purposes, the vertical partition is to be omitted, and instead of the vertical flue, there is to be an opening on one side of the stove, at a small distance above the grate, from which a flue ascends, forming an inclined plane, at the upper end of which there may be a vertical flue, or pipe. Bars of iron, &c. are to be passed in, through suitable valves, so as to occupy a part of the space of the inclined flue, where they are to be heated by the flame and heated air passing through it.

The claim is to "the above provision for heating anthracite coal, and for replenishing the fire with the same when heated; and also in combination therewith, the further provision for heating air as aforesaid; and both, whether the outlet for flame connects with the vertical interior flue, employed where rooms are to be warmed, or the inclined exterior one, employed where interior bodies are to be heated; together with the uses of said improvements as already applied, or to be hereafter applied, in the evolution and management of heat."

We have had an opportunity of seeing these stoves in actual use, but a casual observation in such a case will not justify the expression of a confident judgment respecting their utility; much depends in all such apparatus upon proper management; from all we have seen, however, we think favourably of them, and if their utility is commensurate with the beauty of the pattern, and casting, and the neatness with which they are put together, they will leave little to desire; we were, when lately in Philadelphia, informed by several persons who had used them "for heating rooms," that they were perfectly satisfied with them.

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10. For an improvement in the *Construction of, and Weighing by, the Steelyard Balance;* Erastus and Thaddeus Fairbanks, St. Johnsbury, Caledonia county, Vermont, September 22.

(The specification will appear hereafter.)

Specifications of American Patents.

Specification of a patent for an improvement in the mode of constructing Switches, or Turn-outs, for rail-ways. Granted to William Howard, *U. S. Civil Engineer, Baltimore, August* 2, 1832.

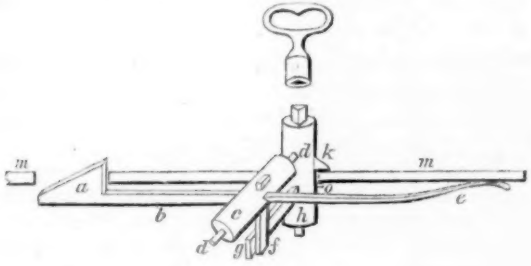
To all to whom these presents shall come, be it known, that I, William Howard, of the city of Baltimore, in the state of Maryland,

have invented a new and useful improvement in the mode of constructing switches, or turn-outs, for rail-ways, whereby the rail-way car, or wagon, is made to pass from the track of the rail-way as occasion requires, which I have called, "Howard's improved switch for rail-ways;" and that the following is a full and exact description of the construction and operation of the said improvement.

The switch now in ordinary use, may be moved from side to side by the hand, as occasion requires, and by any one who may choose to do so. The improvement which I have made consists in a contrivance by which the switch, constructed in the usual manner, is constantly retained in the general direction of the track on which it is fixed, (except when it is desired by the driver or conductor of a car, or train, to make use of it,) so that it shall not be exposed to be opened when not required, by accident, or malicious design, to the peril of lives and property transported upon the rail-way.

Upon the inside of the switch, and about half way between its extremity and the pivot on which it moves, is a hole in the cast iron plate, on which the switch traverses, of a fitting size: through this hole a catch projects from beneath the plate, over which the switch moves, as does the latch of a door; except that the switch does not rise and fall as it passes, but the catch does, retaining the switch in the general direction of the track, unless when it is desired to open it.

Howard's Switches for Rail-ways.



a. The catch, or latch.
b. Lever extending from it.
c. The axle, working on.
d d. Pivots.
e. Spring of the lever.
f. Projecting arm, moved by
g. An arm projecting from
h. The vertical axle.
k. Shoulder, and
o. Pin on do.
m m. The cast iron plate on which the switch moves.

The catch *a*, (see the drawing, a part of this specification,) is at

the end of a lever, *b*, which passes under the plate aforesaid, and through the axle *c*, working on pivots, *d d*, in boxes attached to the plate,—a spring, *e*, retains the catch against the switch, when the latter is in the general direction of the track, by pressing the catch up. An arm, *f*, projects from the axle *c*, at right angles to the plate, and is moved by a similar arm, *g*, projecting against it from the axle *h*, passing perpendicularly through the plate on the outside of the rail, and kept in its place by proper shoulders, *k*, and pins, *o*. The upper end of the axle *h*, is fitted to receive a key that is kept by the driver of the car, or train.

When it is desired to open the switch, the driver applies the key to the head of the axle *h*, and turning it, the arm *g* presses upon the arm *f*, moves the axle *c*, and causes the catch *a* to fall below the upper surface of the plate, when the switch may be opened. When the car, or train, has passed, the switch is shut by hand, and the catch resumes its place. A guard is attached to the switch which covers the catch, and prevents it from being pressed down, and the switch opened unnecessarily.

What I claim as new, and as my own invention, is the fastening of the switch in the general direction of the track to which it is attached; and I also claim as my own invention, the manner by which this is effected; so as to put the switches on the road under the control of the drivers, or conductors, alone, or persons properly using them.

WM. HOWARD.

Descriptive account of, and remarks upon, a patent for an improvement in the art of raising water from the interior of the earth.—Granted to LEWIS DISBROW, *Mechanician, and* JOHN L. SULLIVAN, *Civil Engineer, city of New York, August* 28, 1832.

Mr. Disbrow has been extensively engaged in boring the earth, to obtain a spontaneous flow of water, from what, in Europe, have been called artesian wells. In the present specification two patents obtained by him are referred to; the first, for improvements in the tools and methods employed, bearing date the 24th of March, 1825; the second, for other improvements in the said art, and in the manner of introducing pipes into the perforation. The patentees state that the earth may be bored, or the pipes be introduced according to these plans, or to other known methods; the invention now claimed not depending upon either of these particulars, its essential object being to obtain water in large quantities in those cases where the water will not overflow; or where the quantity afforded is but small.

It was formerly the opinion of Mr. Disbrow, we believe, that overflowing wells might be every where obtained, all that was required being to bore to a *sufficient* depth; in many cases, however, this *sufficient depth* was not reached after the labour of many weeks, when the works were suspended, and have not been resumed. In many

instances, the water would rise to within a few feet of the surface of the ground, but could not be made to overflow; this, we are told, is the case in the city of New York, and its immediate vicinity. According to the principles set forth in the present specification, the idea of water being forced up from the bowels of the earth by some inscrutable *vis a tergo*, appears to be abandoned, as it is distinctly announced that the height to which the water will rise in the pipes, will depend upon that of the source whence it is originally derived; we are glad of this for two reasons, first, because we believe it to be correct, and we love the truth; and secondly, because it will prevent the undertaking of rash projects, in which it will be found much more easy to sink money than to raise water.

The plan for which the present patent is obtained, is the employment of a pump to aid in the raising of water from the bored orifices. It is proposed to fix a valve in the lower tube, with a chamber above it, and a piston with its valve, to work in the chamber; and the patentees are of opinion, that by this means the supply of water will be much increased, as the pressure of the column above the piston will be taken off, and the water supplied by the spring, or vein, in the earth, be left free to supply the place of what is raised, unobstructed by any superincumbent pressure. They say that "the principle of their joint improvement consists in the combination of a piston so constructed, and so placed in, and combined with, the said lowest pipe or joint of the tube set in or projected down the perforation, that the movement or action of the piston may be near the lower extremity of the whole tube in said perforation, and so connected and combined with some mechanical force sufficient to lift with ease the column of water which may be above the piston, as that the piston may be moved with a velocity proportioned, as near as may be, to the rapidity and force of the supply of water at the said lower extremity of the perforation."

We have thus given a full view of the principles upon which the patentees intend to proceed; principles which, in the abstract, we admit to be correct, but yet we are of opinion that the practical results will be very far from justifying their anticipations. Admitting, for the sake of argument, that a large quantity of water might be raised from a pump of this description, there is a high degree of probability that in a very great number of instances the vein would not supply the demand; a fact which cannot be ascertained without actual trial in each individual case, which must necessarily be attended with much labour and expense.

Another point well worthy of consideration, is the inquiry into the facility with which the water can be raised, admitting the supply to be abundant. In this investigation we must take into account the height of the column above the piston, the diameter of the piston, and the length and velocity of its stroke.

The patentees contemplate the raising of the water from the lower section of the tube, and their initial principle requires that this should be done, as the pressure of a high column is to be removed. The loss of power is very great in pumps of great length, from the

necessity of setting a great weight of water into motion at every stroke of the piston, its inertia having to be perpetually overcome, as in the return stroke it is brought to a state of rest.

As regards the diameter of the piston, this has, manifestly, to be circumscribed by the diameter of the tube, which can be sunk in the orifice made by boring; this, we apprehend, can rarely exceed four inches, when the depth is great, but even admitting that six inches might be obtained, we think that even this would not afford a supply adequate to the power which must be expended in obtaining it.

Can this want of sufficient diameter be compensated by the length and velocity of the stroke of the piston? We think not, for the velocity of the stroke cannot, with any advantage, be carried beyond a certain point; it is circumscribed by the very nature of the machinery, and we soon arrive at a maximum in this point. The longer the stroke can be made, the better, because there is less lost by the perpetual opening and closing of the valves, and the frequent coming to rest of the water. But this is the full amount of what can be gained in this way, as the lineal rapidity of the piston cannot be greater in a long than in a short stroke.

These are the principal considerations which induce us to believe that this plan cannot be available for affording a large supply of water through tubes sunk in bored openings in the ground. In the sketch of their plan, which the patentees have deposited in the patent office, a steam engine is supposed to be employed for the raising of the water; and certainly this, or other powerful means, will be necessary, and it will be equally so that the supply should be commensurate.

Towards the end of their specification, the patentees state that a series of valves may be placed at different heights, each to sustain its respective portion of the weight of the column of water. This, it is true, is only incidentally mentioned, and we are convinced that they have never tried such a project, or undertaken the investigation of it, as it will not "hold water." How are such valves to be fixed? not at all, without causing the piston rod to work through a stuffing box in each of them; and suppose them to be fixed, how is each to support its own column? are they not all open in the upward stroke, and for a sensible time afterwards? They would in fact have no tendency to close but by their own weight, as the weight of a continuous column would press upon the bottom only.

Specification of a patent for an improvement in the method of sizing paper by machinery. Granted to JOHN AMES, *Springfield, Massachusetts, Septemper* 1, 1832.

To all persons to whom these presents shall come, John Ames, of Springfield, in the county of Hampden and commonwealth of Massachusetts, gentleman, sends greeting:

Be it known that I, the said John Ames, have invented, made, and applied to use, a new and useful invention and improvement in the method and process of sizing paper by machinery, as is herein set forth and specified, viz. Upon a frame of proper strength and materials, I place, near and parallel to each other, three cylinders of wood, or metal, of about fifteen or twenty inches in diameter, and in length conforming to the width of the paper to be sized, to revolve in a horizontal position upon their respective axes. The boxes, or bearings, upon which the axis of one of said cylinders rests, are fixed; those of the other two are moveable, and governed by screws, so as to regulate the distances of the cylinders from each other. Above the line between the middle cylinder and one of the outer ones, and parallel to them, I suspend a pipe, or trough, pierced with small holes, in such a position that the sizing matter, with which said trough, or pipe, is to be filled, may drop between said two cylinders. Below said cylinders, three parallel rollers, corresponding in length with said cylinders, are arranged so that the middle roller shall be elevated a little above the line of the other two. Above the middle roller, I suspend another pipe, or trough, as above described, to be also filled with sizing matter. An endless web of felt is made to pass over one of the outer cylinders, and between it and the middle one, thence down under the middle roller; thence up between the middle cylinder and the other outer one; thence over the latter, and down under the two lowest rollers; and thence up to the place of beginning. The cylinders are to be brought in close contact by means of the screws applied to the said moveable boxes, or bearings. The paper to be sized is brought over the outer cylinder, and introduced between it and the middle one, immediately under the sizing trough, or pipe, from which the sizing matter drops, and sufficiently wets one side; it then passes under the middle cylinder to which it adheres: the felt passes down under the middle roller, and is wetted by the sizing matter oozing from the lower sizing trough, or pipe; and again ascending, it passes between the other outer cylinder and the middle one, pressing the paper against the latter, and thus sufficiently sizing the other side of the paper. The sized paper is to be then disengaged from the middle cylinder, (to which it adheres as aforesaid,) and taken off by a cylindrical or other suitable reel.

The moving power is applied to the middle cylinder, which communicates motion, by friction, to the other parts of the machine connected by the endless felt. The same result may be produced by a different position and arrangement of parts. I do not claim the cylinders, endless felt web, or other parts of the machine, separately, as my invention; all that I claim specifically as mine, is the several parts of said machine in combination, with the use of the endless felt web, for the purpose of sizing paper.

JOHN AMES.

Specification of a patent for a pulp dresser, for dressing pulp in the manufacture of paper. Granted to JOHN AMES, *Springfield, Massachusetts, September* 1, 1832.

Know all men by these presents, that I, John Ames, have made a new and useful improvement in the method of dressing pulp for the manufacture of paper by machinery, set forth and specified in the words following, viz:—

I construct a vat of convenient size, and insert therein a wire-wound, hollow cylinder, constructed as follows; the skeleton, or frame work of the cylinder, is formed like the common wire cloth cylinder, with no more arms or interior work than are necessary to give strength and form to the cylinder. Instead of the wire cloth, a covering is formed by winding wire of a suitable size over the frame work, with interstices between the wires, of sufficient width for retaining knots, and allowing the dressed pulp to pass through. The cylinder is closed at one end and open at the other, with the open end closely adjusted to the side of the vat for conducting off the pulp, as is described in my patent method of "washing rags." I communicate to the cylinder a rotary motion. The pulp is admitted to the vat, and is dressed, or strained, by the wire covering. The knots, knobs, and other crude matter being retained, and the dressed pulp passing off through the open end of the cylinder to the vats, ready for use.

In some cases it may be convenient to reverse the process by passing the undressed pulp *into* the cylinder, straining it so that the dressed pulp shall pass from the exterior of the cylinder, leaving the knots within.

It may also be more convenient to conduct off the dressed pulp in the first described process, or to introduce the undressed pulp in the last, by means of a hollow arbor, with both ends of the cylinder closed, than by adjusting it as above described.

An agitator of any sort may be inserted in the vat, for stirring up the pulp, (in the first described process,) if the action of the cylinder be not sufficient for that purpose.

The improvement or invention that I claim specifically as mine, is the process or method of dressing pulp for the manufacture of paper, by using the wire-wound, hollow cylinder, or any hollow body, of any other figure, covered, or wound with wire, as above described, for that purpose.

JOHN AMES.

Specification of a patent for an improvement in the mode of setting Glazier's Diamonds, of all kinds. Granted to JOHN DICKENSON, *city of Philadelphia, November 30th,* 1832.

I take the piece of metal in which the diamond is to be set, and drill a hole into it adapted to receive the handle, or shank, by which

it is to be held; not, however, drilling it entirely through, but nearly so; I then take a smaller drill with which I perforate it completely. This leaves a shoulder upon which the diamond, or spark, as it is sometimes called, rests, when dropped into the larger hole, whilst its cutting point passes through, the hole being so adjusted as to allow it so to do. The diamond may be readily adjusted so as to present its cutting point in the best possible position, and it is to be secured there, without soldering, which may be effected in various ways; as, for example, by strong cement, which may be pressed upon it by means of the end of the shank, or handle, which I then pass into the hole prepared for it. The mode, however, which I usually adopt, is the following. I tap the hole which is to receive the shank, so as to form within it a female screw, the shank forming a male screw working freely in it; after dropping the diamond into its place, and adjusting it there, I take a small piece of some malleable metal, and drop upon it, when, by screwing the shank into its place, it is made to press upon the malleable metal, and the diamond will be fixed in a manner which is perfectly secure, whilst it is susceptible of alteration, or adjustment, at any time, with the most perfect facility.

To the ferrule, or handle, I sometimes affix a piece of steel, or other metal, for the purpose of clipping corners, or strips, and removing narrow strips, which is commonly effected by a key, or a pair of pliers. This piece of steel, or other metal, has several notches made in it, of various widths, to adapt it to glass of various thicknesses.

What I claim as new, and as my invention, is the setting of glazier's diamonds, without solder, in the manner, and upon the principle above set forth; I also claim the attaching a piece of steel, or other metal, to the instrument, formed in the manner, and used for the purpose herein described and made known.

JOHN DICKENSON.

Specification of a patent for a mode of affixing sheet tin, and other metallic plates on to the roofs of houses. Granted to ANDREW GANDOIS *and* JOHN SWALES, *Petersburgh, Dinwiddie county, Virginia, January 5,* 1833.

As the mode of procedure is the same, whether sheet tin, or other metallic rolled plates are used, we shall, in our description, speak, generally, of the former article, in order to avoid repetition.

In our method of preparing the sheets, each side of the metallic plate is grooved, or turned over, thus attaching every plate to its contiguous plate, by each of its edges. There are no separate pieces employed to form clamps, straps, or ears for nailing through, this being provided for by the mode of preparing the plate itself. Before the upper edge of the plate is turned over, it is cut in to the distance of three-fourths of an inch, more or less, two cuts being made at the distance of an inch, or any other suitable distance from each other,

and when the edge of the plate is turned over, this is left, and forms a strap by which the tin may be nailed to the roof. This strap we sometimes leave close to one corner of the plate, so that when the side of the plate is turned over, the strap is in two thicknesses; in this case it is cut of greater width than is requisite when the strap is left at some distance from the groove, or turning over.

When larger sheets of metal are used, such as those of copper and iron, two, three, or more straps, may be provided on the upper edge of the plate, the spaces between them being turned over, so as to pass into the groove, or turn over, on the lower edge of the plate, or plates, next above.

What we claim as our invention, and for which we ask a patent, is the connecting the ends of the sheets by turning over, or grooving, at the same time leaving a strap, or straps, upon the sheet to nail them to the roof in the manner herein set forth, and represented in the drawing deposited in the patent office.

ANDREW GANDOIS,
JOHN SWALES.

Abstract of a patent for manufacturing the prussiates of potash and of soda, with other substances; and of fixing the elements of the prussiate of iron, as a substitute for indigo. Granted to FELIX FOSSARD, *of Philadelphia, (who has made a declaration of his intention to become a citizen of the United States,) December* 14, 1832.

The title of this patent, as given by the patentee, is, "An improved method, or methods, of manufacturing the prussiates of potash, and of soda; and a new and improved method, or methods, of applying the said prussiates, or other prussiates of potash and of soda, (with other substances or things which will be described,) and composing and fixing the elements of the prussiate of iron, as a substitute for indigo in dyeing wool in the flock, fleece, skeins, piece, or otherwise; also in dyeing silks, cotton, linen, and other textile or organic substances fit for the purpose of receiving colour, of a blue, blue-black, black, bronze, marron, and any other colours for which indigo has hitherto been employed as a groundwork, principal, or auxiliary."

Several processes have been devised, and patents obtained, for using the prussiate of iron, [Prussian blue,] as a substitute for indigo in the process of dyeing; from these the processes described in the specification of this patent, differ in many essential particulars, which are fully detailed in it, in a manner which manifests a very intimate acquaintance with the principles of chemical science, and with the practical manipulations of the dye-house. The specification extends over twenty-two closely written pages, without containing any thing which is extraneous, but merely those practical directions

and exemplifications which leave nothing to be desired by the scientific dyer. The specification gives the following as the "principal articles on which the claims are founded."

"1st. On methods and processes for manufacturing the prussiates of potash and of soda.

2nd. On the method of passing wool into an acid bath, before fixing the oxide of iron.

3d. On obtaining or fixing the oxide of iron on all textile substances, by means of the decomposition of the protosalt of iron, either by caustic alkalies, carbonates, or earthy alkaline caustics.

4th. On fixing the deutoxide of iron on all textile substances, by immersing them in a bath formed of the protosalt of iron, for example, in the neutral state.

5th. On the means of producing upon textile substances, a uniform oxigenation of the protoxide of iron, or an oxide more oxigenated, by means of a current of heated air blown upon them.

6th. On the use of an alkaline and saponaceous bath after the dyeing operation, before uniting the oxide of iron with the prussic acid of an alkaline prussiate.

7th. On the passing of the textile substances, (more or less dyed by the prussiate of iron,) into a bath of a soluble prussiate, after dyeing them.

8th. On the passing of the textile substances, more or less dyed by the prussiate of iron, either in a bath of protosalt of iron, or a persalt of iron, either the one or the other, or at once into a compound of these salts.

9th. On the means of giving to textile substances dyed with the prussiate of iron, a reddish blue colour peculiar to this salt, when combined with a substance affording a red dye.

10th. On the means of fixing the prussiate of iron, or copper, upon the textile substances, by way of double decomposition, by means of a bath composed of a soluble prussiate, and another composed of a protosalt of iron, or a salt of copper.

11th. On the means of producing green dyes on textile substances by the prussiate of iron, and a vegetable or mineral substance giving a yellow dye.

12th. On the use of boracic acid in the bath, which gives a peculiar red to the blue, and to those which afford a yellow dye, and more particularly to the vegetable colouring materials, in order to obtain green or black dyes by the prussiate of iron, or of copper.

13th. On the means of producing blacks, &c. on textile substances, and on fixing on them the oxides of iron, and of copper, before passing them into vegetable, the colouring, or other baths, and without putting metallic salts into these baths.

14th. On the employment of baths for increasing or diminishing the intensity of colour.

15th. On the means of preventing the change of colour on the dyed fabrics, when exposed to the action of steam or air.

16th. On the general employment of the constituents forming the prussiate of iron, instead of the solid compound so termed, as I do

not actually employ the prussiate of iron known in commerce, but manufacture its principal constituent parts, and bring them into union upon the surface of the cloth, or other textile substance intended to be dyed.

17th. On the principles, the characters, the effects, and consequent results, of the preceding articles, applied to the works of a dye-house."

"Many of the things described in the various processes, are not, strictly speaking, my invention; but I claim the practical and special application to which I adapt them, in the processes of manufacturing the prussiates of potash and of soda, and of dyeing by these and other substances, by the methods indicated."

It is the design of the patentee, we believe, to obtain another patent for apparatus invented by him for the purpose of facilitating some of the operations in his processes; when this is done, we may find it necessary to present those processes, with drawings of the machinery adapted to them. To give them now would, in the opinion of most of our readers, render the present notice unacceptably long.

In order to exhibit the experience of the patentee as regards the utility of his modes of procedure, we give the following extract of a letter from him, which must appear of the greater value, as it was written merely for the satisfaction of the editor, and without any view to publication.

"The advantages offered by my processes over those now in use, are as follows. In the manufacture of the prussiates, there is an easier and much more profitable result in the labour, as for example: by the methods now in use, only about eighty pounds can be produced daily; whereas, by my method, six or seven hundred pounds can be prepared in the same time; by my method, too, all the materials are converted into prussiates, whilst by those now in use, the residuums of the calcinations are generally thrown away, by which a great quantity of potash is lost.

"The difference existing in price between the two principal materials used in dyeing wool, prussiates of potash and indigo, is immense; and must always exist in favour of the prussiate, as indigo cannot be produced to compete with it, without ruin to the planter; the prussiates, on the contrary, will, if a more general and certain means for their employment is created, descend to a very low price, the articles used in their production being extremely cheap; these materials are potash, and those kinds of refuse animal matter which, when not so employed, are actually thrown away. In dyeing by my process, the prussiate is substituted for indigo, nearly pound for pound. The method of dyeing by indigo does not admit of operating upon more than about sixty pounds of wool at one time, whilst by my process I can dye ten times that quantity, with the utmost facility.

"The cloths dyed by indigo, when cut, always appear of a light tint in the middle of the thread; whilst those dyed with the prussiates, by my process, are as dark within as on the surface.

"The fastness of the colour produced by the prussiate of iron, is manifest upon an examination of the two samples herewith sent; the largest is as it came from the fulling mill; the smallest is part of the elbow of an old coat."

The sample last mentioned was worn completely threadbare, but the intensity and uniformity of the colour did not appear to be in the slightest degree impaired, exhibiting none of that mixture of blue and white seen on the seams, and worn parts of indigo dyed cloths.

Mr. Fossard, we learn, has assigned his patent to Capt. Charles Dixey, of Philadelphia.

ENGLISH PATENTS.

Patent granted to GEO. GOODLET, *Proprietor of the London, Leith, and Edinburgh steam mills, for a new method of preparing rough meal from ground wheat, or other grain, previous to its being dressed for flour; also rough meal from ground barley, malt, or other grain, previous to its being put into the mash-tub for brewing or distilling. Dated May* 3, 1832.

This invention is merely the spreading out over a large surface, and to the depth of six inches, more or less according to circumstances, the rough meal of wheat for flour, or of barley for malt, or of oats for oatmeal. Malt is kilned, and oats are kilned commonly, and the process is well understood. Mr. Goodlet's plan is to dry up and improve other grain in the same manner. The floor of this drying room should be over a steam engine, or heated by flues from one, according to the purpose for which it is intended. This is the whole of the invention.

Its fruits are, that the meal or flour is finer, and will produce more abundantly than if ground without this precaution; but its most essential advantage is, that flour rather unsound may be made wholesome and nutricious by this process. The husk, or bran, is also finer and better adapted to its different purposes; new wheat can be ground immediately without any mixture of the old; and, above all, the bread produced from flour thus prepared is better than that of the common process.

"One hundred and twenty-two *loaves* have been produced from a bag of this flour," says Mr. Goodlet; and the same number may be produced from a peck of common flour, say we, for, what *is* a loaf? The specification tells us that the patentee holds certificatess from several most respectable bakers, declaring the superiority of the bread they bake from his flour—a very ingenious mode of mutual puffing! However, we have no doubt that the application of regulated heat to the rough farina might be the means of removing evil qualities from unsound grain, and this is enough to recommend the plan. At present

there is an abundant harvest—the stores of mercy are open, but in a time of scarcity or dearth the recollection of this plan of making that wholesome which is otherwise noxious, must be held in memory.

[*Rep. Pat. Inv.*

Patent granted to RICHARD BURGESS, *doctor of medicine, for his having invented a drink for the cure, prevention, or relief of gout, gravel, and other diseases, which may be applied to other purposes. Sealed February, 21, 1831.*

It has always been our opinion, that patents for medicine in this country, where the specification is exposed to public examination, never can be productive of remuneration to the inventor—for, if the recipe set forth is really efficacious when administered to the disease for which it is prescribed, every physician would avail himself of the knowledge thus afforded, and secretly administer the same medicine with impunity. It is this circumstance which has induced the French government to seal up all specifications for chemical preparations, until the patent has expired, and then to publish them for the benefit of the world at large.

If our opinion be correct in its general application, with what truth it applies to the subject now before us, our readers will immediately see, when we state that the patentee's discovery does not consist in any particular combination of drugs or chemicals, nor in any precise discipline or regimen, but simply in the fact, that water, pure water, taken into the stomach, will cure those complaints which have baffled the art of medicine for numberless ages.

The patentee says that his invention consists in using distilled water as a drink for the prevention and cure of gout and gravel; and he argues that as the water by distillation will be freed from any earthy or mineral matters which it might before have held in solution, and also that the animalculi which it contained will be destroyed, the water will not only be prevented from depositing any injurious substances on the coats of the stomach, but also that it will, by its purity, be induced to take up those which may be formed there.

Temperance is certainly the best preventive against disease, and water in its purest state the most wholesome beverage, but is it not rather hypothetical reasoning to assume that the impurities of the liquids which we swallow are the sources of those diseases which we suffer? Is it not more probable that the solids which we take, by chemical changes in that wonderful laboratory, the stomach, are made to generate, and to deposit those matters which frequently form the embryo or nucleus of future disorders in the system?

[*Lond. Jour.*

Patent granted to F. C. JACQUEMART, *Esq. in consequence of a communication made to him by a foreigner, residing abroad, for an invention of improvements in tanning certain descriptions of skins. Sealed October* 20, 1832.

The patentee states that the skins of hares, rabbits, and sea rats, after having the down removed from them, (which is used in making the inferior quality of hats,) has hitherto been considered too thin to be converted into leather, and consequently has been rejected as useless, except for making glue. It is therefore proposed by a new mode of treatment, both in preparing and tanning, to render these several kinds of skins available to the purposes of making boots, shoes, gloves, and other articles, and it is for this particular method of treating those skins that the present patent is taken.

The description given of the improved process is exceedingly confused, but which, as far as we can make it out, is as follows. After pulling out the long hairs, the skins are to be rubbed with *mercurial aquafortis*, and dried in a temperature of from forty-five to fifty degrees Reaumur's thermometer, then steeped in salt and water, and afterwards in water and blood, in order to give them substance, and to kill the salt, and then in water saturated with *dead lime*. Having been thus prepared, the fleshy parts are to be removed, the hairs taken off, and the skins placed in tan pits, with a solution of sulphuric acid, and treated much as leather is usually treated in tanning, and then prepared by currying, and so forth, according to the kind of leather intended to be produced.

When the skins are to be preserved with the fur upon them, they are first steeped in a solution of alum, and then of lime water, and afterwards dressed as usual, which preparation, it is stated, will prevent the future destruction of the skins by moths.

[*Ibid.*

Patent granted to SAMUEL CLERK, *for his having invented certain improvements in making or preparing saddle linings, saddle cloths, and girths, for keeping saddles in their place on horses and other animals of burthen. Sealed October* 20, 1832.

In order to prevent a saddle from slipping when attached to the back of a horse, it is proposed by the patentee to line the under part of the saddle with a peculiar kind of cloth or webbing, to be made with ribs or cords standing out, which shall, when pressed upon the back of the horse, embed themselves in the hairy coat of the animal, and thereby hold the saddle firmly.

This cloth, or webbing, is to be woven in an ordinary loom, and in place of some of the warp threads, a series of hard twisted cords about

the size of goose quills, are to be introduced, at about half an inch apart, (spaces in the reed being broken away to receive them,) and when connected to the healds of the loom, as the other parts of the warp, they are to be woven together with the weft in the usual way, and so form a cloth or web, with ribs, cords, or ridges, standing out.

This ribbed cloth, or web, is to be attached to the under part of the saddle, by the ordinary means of stitching linings; and it may also be employed for saddle cloths and girths. [*Ibid.*

Patent granted to P. YOUNG, *for a new mode of manufacturing mangle-wurzle, for the purpose of producing certain known articles of commerce. Dated March* 22, 1832.

The articles of commerce proposed to be produced from mangle-wurzle are, first, liquor fit for the use of the distiller and spirit dealer; secondly, liquor fit for the use of the vinegar manufacturer; and, thirdly, a pulp fit for the use of the paper manufacturer.

The mangle-wurzle is first to be cleansed by washing, brushing, scraping, and rashing. It is then to be enclosed in woollen or hair cloths, and the juice forced from it by the application of a hydraulic or other powerful press. The juice is then to be collected and placed in a copper, or boiler, and heated to nearly one hundred and ten degrees of Fah. Diluted sulphuric acid in the proportion of about ten ounces to a hundred weight is then to be added by degrees, and the mixture gradually cooled down to sixty or seventy degrees Fah. Yeast is then to be added in the proportion of one per cent. The liquor is now to be fermented and attenuated by the addition of the least possible quantity, which will answer the purpose of malt and common wash: the acid to be employed is to be diluted in the proportion of one part of acid to five parts of water, and ten ounces of the mixture applied to 100 gallons of liquor.

The residue of the mangle-wurzle left in the press after the juice has been expressed is to be employed in the manufacture of vinegar by adding to one ton of it a hundred gallons of cold water, and applied with saccharine matter to the production of vinegar, according to the process usually adopted in the manufacture of that article.

The fibrous refuse of this manufacture is now to be prepared for the paper maker by the application of a bath, consisting of water and acid in the proportion of a hundred gallons of water to two pounds of acid. It is then to be bleached by the application of sulphuric acid gas, or chlorine in the usual manner; and the pulp thus obtained is to be mixed with that of rags, or hempen materials, in the proportion of ten to fifty per cent., according to the quality of paper required.

[*Reg. of Arts.*

List of French Patents.

A List of Patents for Inventions, Improvements, and the introduction of Foreign Inventions or Improvements, granted in France during the third quarter of the year 1831.*

[TRANSLATED FOR THIS JOURNAL.†]

Ardaillon, Bessy & Co., Saint Charnond, (Department of the Loire,) September 20th, (10 years.) A process for manufacturing gun barrels under the roller. (P. Invent.)

Ph. Aubin, statuary, Paris, August 16th, (5 years.) Method of paving in mosaic. (P. Invent.)

St. Benard, Paris, September 10th, (5 years.) A portable and economical furnace, and steam stove. (P. Invent. Improv.)

Berard and Wilkinson, represented at Paris by M. M. J. Luce, August 16th, (15 years.) A bobbin and its wain, adapted to the spinning, stretching and twisting of silk, flax, hemp, wool, and cotton thread, and of every other filamentous substance. (P. Import. and Improv.)

J. Boivin, jr, mechanician at Saint Etienne, (Department of the Loire,) August 6th, (5 years.) A process for manufacturing gun barrels under the roller. (P. Invent.)

John Boivin, jr., mechanician at Saint Etienne, (Department of the Loire,) September 10th, (5 years.) A process for manufacturing gun barrels under the roller. (P. Improv.)

F. Bollen, starch maker, at Maison-sur-Seine, represented at Paris by M. Armonville, August 1st, (5 years.) A fixed sieve, with an iron stirring apparatus, moved by wheels, calculated to extract the fecula of potatoes, and to sift the starch. (P. Invent. Improv.)

L. H. Boquet, bronze colourer, at the Sevres manufactory, August 1st, (10 years.) A mechanical inkstand, calculated to keep the ink fluid, and which can be filled and emptied at pleasure. (P. Invent. Improv.)

Lewis Brunier, architect, Paris, August 6th, (15 years.) A hydraulic apparatus which he calls Continuous Hydromoter. (P. Invent.)

Peter, Anthony, and Lewis Burat, brothers, truss makers, Paris, September 10th, (10 years.) New trusses with fixed cushions, and with moveable and folding springs. (P. Invent. Improv.)

Francois Ar Caron, lamp maker, Paris, September 10th, (5 years.) Improvements made in the hydrostatic lamp of the brothers Girard. (P. Invent. Improv.)

J. C. Chabert and L. Legris, Paris, August 1st, (10 years.) A portable wind mill. (P. Invent.)

* P. Invent. denotes patents for inventions. P. Invent. and Improv. patents for invention and improvement. P. Improv. Patents for improvement. P. Import. Patents for importation, or the introduction of foreign inventions and improvements.

† By request of the Committee on Publications.

George Choisy, Paris, August 16th, (5 years.) A reckoning foot board, applicable to carriages. (P. Invent.)

George Choisy, Paris, September 10th, (5 years.) A reckoning foot board applicable to carriages. (P. Improv.)

Nicholas Clement Desormes, engineer, Paris, August 29th, (15 years.) Substitution of wood instead of charcoal, in certain furnaces. (P. Invent. Improv.)

Nicholas Clement Desormes, engineer, Paris, September 12th, (15 years.) Substitution of wood in lieu of charcoal, in certain furnaces. (P. Improv.)

Lord Cochrane, of London, represented at Arras by Martin, attorney, and at Paris by Columbus Gengembre, architect, August 6th, (15 years.) An improved rotary engine to be worked by steam, &c. or employed for other purposes. (P. Import.)

A. Courtet, mechanician, Lyons, August 6th, (10 years.) A machine for glossing milled stuffs of silk, cotton, or wool. (P. Invent.)

J. Fr. Cornu, watch maker, at Havre, September 10th, (5 years.) A marine clock which can be used as a jack. (P. Invent.)

Hyp. E. Descamps, at Agen, September 10th, (5 years.) A stove for preserving plums. (P. Invent.)

C. A. Dronsard, at Neuilly, near Paris, August 1st, (5 years.) Method of manufacturing a stuff, which he calls Philippine, for making hats, wall hangings, &c. (P. Improv.)

C. A. Dronsard, at Thernes, near Paris, September 10th, (5 years.) Method of manufacturing a stuff, which he calls Philippine, for making hats, wall hangings, &c. (P. Improv.)

Baz. Ducel, chemist and mechanician, Lyons, August 6th, (10 years.) Apparatus for drying dyed silks, and stuffs made of silk, wool, or cotton, and for desiccating gelatinous substances and strong glues. (P. Invent. Improv.)

Durand & Co., dyers, Department of the Loire, July 18th, (10 years.) Process for forming designs on all sorts of silk, wool, and cotton stuffs, by means of pressure. (P. Improv.)

John Everth, of London, represented at Paris by Truffaut, August 6th, (15 years.) Processes for separating the two constituent principles of palm oil, in order to use one as a lamp oil, and the other for the manufacture of candles. (P. Invent. Improv.)

E. Felissent, Lyons, July 18th, (15 years.) An apparatus for desiccating by air heated directly by fire. (P. Improv.)

Festugieres, brothers, iron masters, August 22nd, (10 years.) Rollers with a single cylinder and bed, for the manufacture of Biscaian guns, balls, and other articles of smith's work heretofore stamped. (P. Invent.)

J. Forgues, mechanical engineer, Bourdeaux, September 10th, (5 years.) An apparatus which he calls a physico-mechanical safety apparatus, for preserving houses and persons from destruction by fire. (P. Invent.)

Cl. M. A. Francois, jr. and Ed. Michel Benoist, represented at Paris by Mr. Armonville, secretary to the conservatory of arts and trades, September 30th, (5 years.) A globe of paper or satin, which be-

comes inflated when shaken, and can be folded up so as to be portable. (P. Import.)

J. D. C. Gavard, captain of staff, Paris, September 20th, (10 years.) An apparatus for drawing and engraving, by a continuous motion, and without any knowledge of the art of drawing. (P. Improv.)

Ant. Georges, mechanician, Lyons, September 20th, (10 years.) A machine for thrashing and winnowing corn, at the same time. (P. Improv.)

Jos. Gibson, lace maker, Lisle, August 29th, (10 years.) Method of manufacturing tulle, or silk lace. (P. Import.)

J. M. Giudicelli, professor of mathematics, Paris, and C. L. Harel, Merchant, Paris, September 10th, (5 years.) A mechanical apparatus, which they call a percussion vane. (P. Invent.)

P. L. Et. Guilliny, silk trader at Lyons, Department of Drome, August 29th, (10 years.) A process for giving a determinate length to the flocks of silk, which are wound upon reels, as fast as they are worked. (P. Improv.)

Thomas Hall, Havre, September 30th, (5 years.) A machine to make compressed tree-nails. (P. Import. Improv.)

Hyp. Houldworth, jr. of Manchester, represented at Paris by Mr. Perpigna, August 29th, (15 years.) An improvement in the manufacture of cotton, flax, silk, or any other filamentous substance, employed separately or mixed, so as to produce a fabric applicable to different purposes. (P. Import. Improv.)

Nicholas Houzeau-Muiron, of Reims, at Paris, September 10th, (5 years.) A process for making metallic tubes applicable to artillery, to fire arms, and to other purposes. (P Invent. Improv.)

Abraham Emanuel Jaccond, merchant at Vienna, represented at Lyons by Mr. Bert, merchant, August 16th, (10 years.) Processes to be applied to stocks, axle-trees, sockets, and pivots of every description of wheels, possessing the advantage of containing in each of these parts, and without any loss, the oil necessary for greasing it. (P. Improv.)

Hyp. Janford, mechanician, Paris, represented by Ashby, paper manufacturer, September 10, (5 years.) A machine which he calls a purifier, intended to separate from the pulp which forms paper, all particles which may soil it, or roughen the surface. (P. Import.)

A. Jeuffrain, at Tours, August 6th, (5 years.) A hydraulic press, for the compression of substances from which any liquid is to be extracted, and of those whose bulk is to be reduced, or to which any determinate form is to be given. (P. Invent.)

F. L. John, mechanician, Paris, September 10th, (5 years.) Mechanical legs of iron. (P. Invent. Improv.)

C. Juillet, jr., Lyons, July 13th, (15 years.) A machine for manu facturing all sorts of figured stuffs. (P. Improv.)

Fred. Kalkbrenner, Paris, August 1st, (5 years.) A hand guide, intended to facilitate the study of the piano forte. (P. Invent. Improv.)

Franc. Ant. Klenck, iron and brass founder, Paris, September 10th, (5 years.) A machine for manufacturing small nails or tacks, called *Pointes de Paris*. (P. Invent. Improv.)

J. B. M. J. Lancry and Nicholas Charoy, Paris, August 29th, (5 years.) A musket, or fowling piece, to fire two shots with a single barrel and lock. (P. Invent.)

L. Séb. Lenormand, professor of technology, Paris, August 22nd, (10 years.) A new system of lighting. (P. Invent.)

[TO BE CONTINUED.]

¶ TRANSLATIONS FROM FOREIGN JOURNALS.

[Translated for this Journal.*]

New Process for Purifying Oils.

The practical and useful methods of discolouring and purifying vegetable oils, are all based on the same principle; namely, the use of oil of vitriol, (concentrated sulphuric acid.) Authors who have written on the subject, do not agree as to the proportion of acid to be used, but it is essential not to go beyond certain limits. Oils are not all capable of being clarified to the same extent, so that by proceeding exactly as is done at Lisle, in France, and using the same quantities of acid and of oil, a clear oil is by no means certain to result. The same anomaly will be observed if the expressed oils are used which have been made of seeds that have not been heated or preserved with equal care. The methods used by the manufacturers of Lisle are as follows:

First Process.

Pour gradually into eight hectolitres† (210 gallons,) of oil, which is stirred during the operation, twenty pounds of concentrated sulphuric acid. After the mixture has been agitated without intermission from three-quarters of an hour to an hour, with a large spatula, perforated at the end, add to it one hectolitre of pure spring water, and continue to stir rapidly for twenty minutes. Let the mixture rest fifteen days and then decant it very carefully, pouring on the strainers the oil which swims on the surface, after having first beaten it with a new quantity of water, (about one hectolitre:) this operation may be performed four days before the filtration. In order to separate the mucilaginous particles that might stop the strainer, pass the oil through a hurdle covered with a very thin woollen cloth.

Second Process.

The method of purifying oil, by decoction, used by the makers of

* By request of the Committee on Publications.

† The hectolitre is a French measure of capacity equal to about 105 English quarts, or 26¼ gallons.

varnish, has been applied by the Dutch manufacturers. The following is their manner of operating:

Pour into a boiler capable of containing from six to eight hectolitres (157½ to 210 gallons,) the three-fourths of its capacity of oil, and bring it quickly to ebullition; throw in, from time to time, a few litres* (quarts,) of cold oil, at the places where the ebullition is the strongest, and sprinkle now and then, with the ends of the fingers, a few drops of water, which being instantly vaporized, will not cause danger. At the end of fifteen or thirty minutes, the fire is allowed to subside, the oil becomes cool, and is carefully decanted. It is then clarified as in the first process, except that only half the quantity of sulphuric acid must be employed; and if the operation is not perfect, it must undergo a second treatment, by a small quantity of acid. This process is more tedious than the first, and consequently is less frequently used; there are, however, some oils which require this previous operation. Light coloured oils are the most easily purified by these two processes.† When the refiners are, at the same time, manufacturers, they should moisten the seed which is to supply the oil for clarification more than the rest, taking care not to mix with the oil those from a second boiling, and decanting before the addition of the acid; and on the day previous to the clarification, the oil should be stirred for twenty-six minutes with three or four per cent. of boiling water. The object of this addition is to moisten the mucilage, which is then more easily attacked by the acid. This water must be added and withdrawn previous to the operation of clarifying.

Filtration.

The process for purifying oils by filtration has not undergone any considerable change for some years. The use of sawdust instead of charcoal did not answer the expectation of the refiners. The renewal of this article as often as is required, is rather expensive, and there is always a quantity of oil absorbed, which cannot be entirely recovered by pressure. Whatever be the method employed, it is necessary to operate in a dry and warm place, at a temperature of fifty-nine to sixty-five degrees Fah., kept up during both day and night. In order to effect this some persons place the filters in cellars where there are fires, and sometimes they surround the filtering vessels by a second enclosure, into which steam is introduced. The filtering vessels generally used are upright casks, open at the top, and perforated at the bottom with a great number of holes: a layer of cotton is placed in each cask from two to four inches in thickness, and supported by canvass; the casks are then filled, and the tops covered with a piece of cloth to keep out dust.

* One litre is equal to one and one-twentieth of a quart.

† The methods in common use in many parts of France to extract oils are liable to objections: the oleaginous seeds are too much roasted, and not sufficiently moistened. The oils resulting from them are too deeply coloured, and are difficult to clarify.

Second process.—Into a cask open at the top, and perforated at the bottom, as in the process just described, put a layer, two inches in thickness, of charcoal, broken into pieces of the size of a hazle-nut, and washed.* Over this layer a second stratum is placed, four, six, or eight inches thick, and composed of charcoal broken into smaller pieces. Above both of these a layer of cotton is placed, supported by a piece of coarse canvass.

Third process..—Into a hamper, six feet in height, five feet in diameter at its mouth, and one at the bottom, placed in an inverted position, are fixed by means of canvass several layers of cotton; likewise on the perforated bottom of a cask a layer of two or three inches of cotton is placed, which must be covered by saw dust of white wood (not pine,) to the thickness of eighteen or twenty inches.

These different processes, simultaneously or separately employed, constitute the whole secret of filtration. It may be found adviseable to vary the thickness and number of layers; a point which the manufacturer must determine for himself.

[*Journal des Connais Usuelles.*

Manner of imparting a beautiful Watering (moiré) to Brass.

Having had occasion to boil in a solution of sulphate of copper, some pieces of brass, such as candlesticks and various articles of ornament, I observed the effects of a crystallization, analogous to watering, but more rich because it reflected more light. One point was particularly striking, namely, that spangles bearing an exact resemblance to opal, seem to be united with a deep coloured paste, formed of finer reddish crystals. Certain brasses assume the appearance of porphyry, others of granite, with various shades, according to the proportions of zinc and copper therein contained. In some instances an article will become of a deep red colour or dark violet, without any appearance of reflection produced by the solution; and, when carefully washed, a white dust will be formed on its surface; but a slight friction, with small quantity of varnish, will suffice to give the desired appearance. A few small iron nails left in the solution will quicken the operation. As to the strength of the solution it can only be determined by experiment, but it should be concentrated and boiling. One pound of sulphuric acid to two of water appeared to me quite sufficient. The pieces which are to undergo the operation may be suspended by a thread, so as to be conveniently dipped into a boiler of glass, or of glazed earthenware. [*Ibid.*

* The charcoal is to be washed while in lumps, and then carefully dried in a stove.

Simplified Application of Steam.

At a meeting of the Paris Academy of Arts and Sciences, held on 7th January, a memoir was read, in which M. Pelletan treated of the dynamic effects of a jet of steam, and the means of applying it, in a simple and cheap way, to the purposes of the useful arts. "A jet of steam," says the author, "when thrown into a cylindrical conduit, or into a pipe filled with air, imparts the active power with which it is endued to the column of air, without any other loss than that occasioned by the friction in the conduit or pipe."

His detail of the results, which have already ensued from his discovery, are deserving of attentive notice. A jet of steam issuing through an orifice of a milimetre, ($\frac{03937}{100\,000}$ of an inch,) under a pressure of five atmospheres, possesses a velocity of five hundred and fifty-nine metres, ($1084\frac{3}{8}$ feet,) per second; it consequently moves at the same rate of velocity as a bullet discharged from a gun.

But this enormous velocity is, in its simple form, of no practical benefit, inasmuch as it cannot be converted into a useful agent; when, however, the steam has been enabled to impart motion to a quantity of atmosphere, the velocity, it is true, is diminished, but the mass set in motion is increased; and, by this operation, the active power of the jet of steam is susceptible of general application.

The elastic force of steam has hitherto been employed under pressure, by the aid of machines, which are necessarily complicated, and involve a serious loss of power from their bulkiness and friction; but steam, acting immediately by its own power, can be made to effect its objects in machines of so simple a construction, that a steam engine of one man's power may henceforth be worked by a common fire.

M. Pelletan remarks, that the force of steam, so applied, may be brought directly in aid of the machine, and will enable him to double and treble his daily gains, instead of its powers being limited, as hitherto, to filling the coffers of great capitalists at a compound ratio.

The same jet of steam, when applied to the purpose of increasing the draft of furnaces, enables the proprietor to reduce their diameter to two inches, even where a large furnace is in question, to lead the smoke in any direction which may suit him best, and to make use of the whole heat produced. By means of this jet a vacuum may be effected at will, in any given space, however considerable it may be, and permanently maintained, not only at very small cost, but through the medium of an apparatus of the simplest construction. This process is of ready application wherever evaporation or desiccation are to be effected. Acting upon a column of air, the jet supplies the simplest and most efficacious mode which can be adopted for creating blasts in forges, furnaces, &c.

It appears that the inventor claims priority in this important discovery, inasmuch as he communicated the properties of the jet in a paper addressed to the Academy in 1829, and he is tenacious of the claim in consequence of the later application of the jet in impelling steam carriages in England. [*Athenæum.*

¶ *On the timber used for the Masts of Ships.*

Communicated to the Nautical Magazine by JOHN FINCHAM, Esq., Superintendent of the School of Naval Architecture in his Majesty's Dock Yard at Portsmouth.

[Continued from p. 137.]

The experienced mast maker forms his opinion of the quality of a stick, not only from the colour, smell, and appearance of the grain, but by its working; for as a stick is more or less tough or fragile, the greater or less difficulty he has in separating its parts, as he chops them off. If the timber be good, its parts, on being separated, appear stringy, and oppose a strong adhesion; and the shavings from the plane will bear to be twisted two or three times round the fingers: whereas, if the stick be of a bad quality, or in a state of decay, and has lost its resinous substances, the chips and shavings come off short and brittle, and with much greater ease.

Table I.

Experiments on pieces three inches square, and two feet long beyond the support, fixed at one end; weights acting at two feet.

Distinguishing No.	Species of Timber.	DEFLECTION. with five cwt.	with 10 cwt.	with 12½ cwt.	with 15 cwt.	Weight that the pieces broke with.			Specific gravity	Remarks.
		ins.	ins.	ins.	ins.	cwt	qrs	lbs.		
1	Riga Top	,52	1,02	2,07	3,1	16	2	0	605	All the specimens in these expt's. were dry.
2	— Butt	,4	,8	1,5	2,87	18	3	0	668	
3	— —	,37	1,0	1,37	1,62	16	1	0	821	
4	Red Pine Top	,63	1,42	2,68		14	2	6	544	
5	—— Butt	,6	1,07	1,95		16	3	1	634	
6	Am. Spruce Top	,56	1,32	2,13		13	2	6	504	
7	—— Butt	,5	,9	1,67		15	3	22	570	
8	Norway Top	,55	1,04			12	0	26	464	The butts of these specimens were tough.
9	—— Butt	,62	1,35	1,97	3,0	16	2	12	506	
10	Adriatic Top	,5	1,0	2,0		12	3	26	467	
11	—— Butt	,4	,7	1,4		15	1	8	493	
12	Yellow 6 inch Top	,62	2,0			11	1	0	406	The heart of pune, in all cases was considerably weaker in proportion to the outside than any of the other experiments.
13	——— Butt	,63	2,12			12	1	18	493	
14	Scotch Spruce Top	,58				9	3	16	389	
15	——— Butt	,54	2,0			10	3	26	440	
16	Cowrie Top	,37	,75	1,12	1,62	17	2	0	626	
17	— Butt	,5	,87	1,25	1,87	18	3	0	632	
18	Pune Top Outside	,46	,62	,9	1,4	18	2	14	654	
19	— — Heart	,62				9	3	18	608	
20	— Butt Outside	,37	,75	1,0	1,25	20	3	14	646	
21	— — Heart	,57	,8			10	3	24		

Table II.

Experiments on pieces three inches square, supported on two props, four feet distance; weights acting at the middle.

Distinguishing numbers	Species of timber.	Deflection with 15 cwt.	What it recovered by its resilience when the weight was removed.	Deflection with 22½ cwt.	What it recovered by its resilience when the weight was removed.	Deflection after one hour's pressure with 22½ cwt.	What it recovered by its resilience when the weight was removed.	Weight that the pieces broke with			Specific gravity.	Remarks.
		ins.	ins.	ins.	ins.	ins.	ins.	cwt	qrs	lbs.		
1	Riga top	,31	,29	,62	,59	,97	,91	32	2	14	664	Pieces in these expt's were green.
2	— butt	,25	,22	,53	,5	,85	,73	35	1	10	720	
3	Red pine top	,81	,68	1,37	1,13	1,4	1,1	23	1	6	627	Most of these broke off after the pressure had continued about five minutes.
4	—— butt	,63	,59	,95	,91	1,2	1,05	28	3	24	712	
5	Am. spruce top	,37	,36	,62	,6	1,87	,95	21	1	26	598	
6	—— butt	,31	,29	,63	,61	1,07	,95	23	2	14	643	
7	Norway top	,57	,50	,82	,8	1,37	,93	21	2	0	572	
8	— butt	,58	,56	,84	,82	1,37	,95	23	1	14	595	
9	Adriatic top	,30	,29	,42	,4			21	1	6	532	
10	—— butt	,29	,27	,43	,41	,65	,45	23	0	16	582	
11	Yellow pine top	,89	,77	1,41	1,1			21	2	0	553	
12	—— butt	,73	,6	1,0	,9			23	3	26	661	
13	Scot. Spruce top	,84	,83					18	2	0	478	
14	—— butt	,72	,7					19	2	6	542	
15	Cowrie top	,31	,3	,43	,41	,62	,54	35	2	7	626	
16	—— butt	,31	,3	,43	,41	,62	,54	36	0	0	643	

Table III.

Experiments on pieces three inches square, supported on two props, four feet distance; weights acting at the middle.

Distinguishing numbers	Species of Timber.	Deflection with 15 cwt.	What it recovered by its resilience when the weight was removed.	Deflection with 22½ cwt.	What it recovered by its resilience when the weight was removed.	Deflection after one hour's pressure with 22½ cwt.	What it recovered by its resilience when the weight was removed.	Weight that the pieces broke with			Specific gravity.	Remarks.
		ins.	ins.	ins.	ins.	ins.	ins.	cwt	qrs	lbs.		
1	Riga top	,5	,48	,93	,87	1,01	,97	32	1	4	516	Pieces in these exp'ts. were dry.
2	— butt	,31	,3	,62	,56	,97	,85	34	1	14	633	
3	Red Pine top	,56	,51	1,25	1,13	1,37	1,2	23	0	0	514	
4	—— butt	,42	,40	,62	,56	,69	,6	25	0	0	644	
5	Am. spruce top	,47	,38	,91	,87	1,08	,97	22	2	26	488	
6	—— butt	,47	,35	,82	,78	1,06	,94	22	3	1	546	
7	Norway top	,51	,49	,83	,81			21	0	14	464	Very good specimens.
8	—— butt	,57	,56	,84	,8	1,0	,81	23	0	14	506	
9	Adriatic top	,27	,25					21	0	26	443	
10	—— butt	,25	,23					22	1	23	462	
11	Yellow Pine top	,6	,48					21	1	0	395	
12	—— butt	,66	,5	,99	,67	1,6	1,21	23	2	0	442	
13	Scot. Spruce top	,75	,72					15	2	14	348	
14	—— butt	,62	,61					17	2	0	442	
15	Cowrie top	,56	,56	,68	,64	,75	,67	32	1	0	560	
16	— butt	,27	,27	,43	,43	,5	,48	35	1	0	582	
17	Pune top	,32	,32	,61	,6	,64	,62	35	2	14	632	
18	— butt	,25	,25	,56	,56	,62	,61	37	1	8	658	

Table IV.

Experiments on pieces three inches square, supported on two props four feet distance; weights acting at the middle.

Distinguishing No.	Species of Timber.	Deflection with 15 cwt	What it recovered by its resilience when the weight was removed.	Deflection with 22½ cwt.	What it recovered by its resilience when the weight was removed.	Deflection after one hour's pressure.	What it recovered by its resilience when the weight was removed.	Weight that the pieces broke with.			Specific gravity.	Remarks.
		ins.	ins.	ins.	ins.	ins.	ins.	cwt	qrs	lbs.		
1	Riga	25	,25	,37	,33	,4	,33	40	1	22	610	The pieces in these expt's. were very dry, and particularly good specimens.
2	Red pine	36	,35	,68	,62	,86	,78	33	3	0	544	
3	Yellow pine	37	,3	,78	,72	1,0	,82	24	2	12	439	
4	Norway	31	,3	,61	,6	,86	,63	29	1	16	517	Broke after the pressure had continued 15 minutes.
5	Scotch pine	62	,6	,93	,9			22	2	0	453	
6	Cowrie	29	,29	,46	,44	,5	,45	36	2	22	579	

Table V.

Specific gravity, relative strength, flexibility, and resilience, of the different timber used in mast making.

Distinguishing No.	Species of timber.	Mean specific gravity. Green.	RELATIVE. Strength.	Deflection.	Resilience.	Mean specific gravity. Dry.
1	Riga top	682	1000	1000	1000	576
2	— butt	754				656
3	Red pine top	647	853	1500	980	544
4	—— butt	741				638
5	American spruce top	627	764	1100	905	541
6	—— butt	678				582
7	Norway top	595	740	1260	860	509
8	— butt	616				520
9	Adriatic top	552	709	864	872	467
10	—— butt	585				493
11	Yellow pine top	562	746	1520	750	430
12	—— butt	665				472
13	Scotch spruce top	475	476	1450	1100	389
14	—— butt	536				440
15	Cowrie top	604	974	920	1086	571
16	— butt	663				619
17	Pune top		1226	978	1146	632
18	— butt					662

The foregoing experiments the writer made to ascertain the principle relative qualities of timber used for the masts of ships. The experiments were made on a larger scale than usual; so that small defects to which they are always liable, could not greatly affect the results. They were also conducted with great attention and care.

The results inserted in these tables are not taken from single experiments, but are the mean results of numerous experiments on the same kinds of timber. The defects common to experiments on specimens of timber, caused by the crossing of the range of fibres, or from the fibres not firmly adhering, render it necessary not only to make the experiments on large specimens, but on a great number of them, and that the pieces should be cut from different trees. For, in the experiments that were made, a piece of Riga, well charged with resin, the specific gravity 821, was found to bear only sixteen cwt.; whereas, a piece of yellow pine, of the same length and size, with its specific gravity 504, was found to bear twenty-five cwt.; a piece of red pine, likewise, with a specific gravity 527, was found to bear only eighteen cwt.; while a piece of Scotch spruce, the specific gravity of which was only 450, was found to bear twenty-five cwt. Now, if a comparison had been drawn from these results, since the experiments were good, and the pieces to appearance equally good, the conclusion would have been that the yellow pine was far superior, in respect to strength, to the Riga, and the Scotch spruce to the red pine; and the same for all the other species of wood upon which the other experiments were made. A like error may likewise be fallen into, on the contrary side, in determining the relative strength by a single experiment: since a piece of Riga was found to bear forty-two cwt. while a piece of yellow pine was found to bear only twelve cwt.; and a piece of red pine thirty-three cwt., while a piece of Scotch spruce was found to bear nine cwt. To have taken, therefore, these experiments for their relative strength, or the extreme for the mean strength, would have given results contrary to what a greater number of experiments has determined; for we find the mean weight that Riga will bear, will lie between thirty-two and thirty-six cwt., yellow pine between twenty-four and twenty-six cwt., red pine between twenty-seven and thirty cwt., and Scotch spruce between thirteen and seventeen cwt.

From these inequalities in timber, the same incorrect conclusions, without repeated experiments, will likewise be drawn in determining the specific gravity, relative deflection, and resilience of the different timbers.

In table V. the different timbers are placed with their relative qualities, taking the Riga at 1000; the qualities are not deduced altogether from the experiments given in the preceding tables, but from a regular series to determine the mean, without taking into account the extremes that, as before stated, are to be found in most kinds of timber.

The Riga, and other timbers, containing a proper quantity of resin, and the red pine, from the fineness and closeness of its grain, and adhesiveness of its fibre, not only maintain their resilience, but strength and flexibility, much longer, even to a very dry state.

The cowrie possesses advantages over most other timbers, from the firmness of its grain, and uniformity of its texture. In all the experiments made upon its strength, both dry and green, it was found commonly to bear thirty-six cwt. and never to bear less than thirty cwt.; while at the same time, the heart appeared equally strong with the outside.

The experiments that have been made on this timber, compared with the Riga, Dantzic, and other esteemed firs, justify a conclusion that it possesses qualities equally good with these timbers, for all the purposes for which they are generally used. The cowrie, by being exposed to the weather, appears less liable to shrink, and stands equally well with them. A piece half an inch thick, and about a foot wide, with a wind shock extending part of the way up from one end, was exposed to the vicissitudes of the weather for more than eighteen months, after which period it was no more shaken, and underwent no other alteration than the sap that was on it to some distance from one edge disappearing, and leaving it with the colour and the firmness of the wood fully elaborated. Most of the cowrie spars that have been brought to England, appear but a little beyond the saplings, since many of the full grown trees are said to exceed thirty feet in girth, and to continue the full size to nearly sixty feet from the ground. Their common diameter is from three to six feet, and their length frequently from ninety to one hundred feet clear or branches.

From the experiments that have been made on the different kinds of timber employed in mast making, and the results of which are confirmed by experience in the use of them, a fair conclusion may be drawn, that timber whose specific gravity does not exceed that of the Riga, and whose strength, tried on pieces of the same dimensions, and under the same circumstances as those in the foregoing experiments, which is found equal to bear twenty-four cwt. with its flexibility and resilience, within the limits of the results in these tables, may be considered suitable for the purposes of mast making, as far as respects these qualities; while its durability may be judged of by close observation on the texture of its fibres, uniformity of growth, and by the quantity and state of the resinous substances it contains.

[*Quoted from Rep. Pat. Inv.*

¶ *Selections from Lectures on Pottery, delivered before the Royal Institution, London, by* A. Aikins, F. L. S. F. G. S.

(Continued from p. 135.)

Tiles, from the purpose to which they are applied, namely, the roofing of houses in order to shoot off the rain, require a texture as compact as can be given to them, consistent with a due regard to economy. The fattest and most unctuous clays are, therefore, those which answer the best, especially if free from gravel and the coarsest sand. The price of the tiles compared with that of brick is such that the

manufacturer can afford to dry them under cover; while, being not more than one-quarter of the thickness of bricks, the drying is more speedily performed, and with far less hazard of warping or cracking: the same also is the case with the baking. Sand is added to the clay, but sparingly, for if, on the one hand, it prevents the ware from warping, yet, on the other, it increases the porosity, which is a fault especially to be avoided. The general manipulations of grinding the clay and tempering it, are analogous to those already described for making bricks; but more pains are bestowed in getting it to the utmost degree of plasticity, so as to allow of its being rolled like dough, into cakes of a proper thickness, which are afterwards brought to the required shape by pressing them into a mould.

The material employed at the manufactories of tiles in the neighbourhood of London, is the bed of blue clay, called by geologists the London clay, or the plastic clay, which lies below the former. The tileries north of the Thames, at Hackney, Clapton Terrace, Hornsey, and Child's Hill near Hampstead, are on the London clay; those near Woolwich are on the plastic clay. The same clay answers well for sugar cones, for garden pots, and all articles of common red ware that do not require to be glazed, and in which a certain degree of porousness is no objection to their use.

If well tempered clay be placed on a horizontal board, to which, by any simple machinery, a movement of rotation on its centre is given, it is evident that a tendency to centrifugal motion will be communicated to the clay, which, though not of itself sufficient to overcome the tenacity of the earth, will extremely facilitate the action of the fingers in forming out of the mere lump, either solids or hollow vessels, of every conceivable variety consistent with the condition that the section of such vessels in any part at right angles to the axis shall be a circle. The board above described, is called the potter's wheel or lathe. By whom it was invented is not known, for in the most ancient records it is spoken of as an implement familiar to every one. The potter's wheel is frequently mentioned in the Jewish writings; and Homer, the most ancient of the Greek authors, has a comparison, the subject of which is a potter turning round with his hands a newly fitted wheel, to see if it runs true. In India, where implements and tools for the manufacturer, are reduced to their utmost possible degree of simplicity, the potter squats on the ground, turning the wheel on its spindle with his feet, while he moulds the clay with his hands. In this country, and I believe in general throughout Europe, the workman turns the wheel by a treadle, as he sits or stands to his work; and, when the article to be made is large and heavy, the motion is given by an assistant working at a vertical wheel. In large establishments where many of these wheels, or lathes, are in use, a steam engine is generally employed as the prime mover. It is impossible to describe by words the facility and quickness with which the clay obeys the hand of the workman, and takes the figure required; it must be seen in order to be truly judged of; and few processes are more entertaining to the bystander, because there are none in which the effect more immediately follows the application of the cause, and in which the

material is so completely under the control of the workman, adapting itself to his taste, his whim, his caprice; in which the form that has been just given, may be annihilated by a touch, and the material may be immediately made to assume its former, or a wholly different figure. No wonder, therefore, that "clay in the hand of the potter," is so often and so impressively used to denote the relative situations of man and of Him who guides and moulds our purposes at his pleasure.

I shall now proceed to give a brief account of the manufacture of the common red pottery ware as practised in the neighbourhood of London, and in various other parts of the kingdom. The material is a yellowish brown clay, from Deptford, there being no other near London on which the glaze will spread with the equality that is required. In general the clay is used without any addition, but such parcels as are too fat or tenacious are brought to a proper state by mixture with loam. The clay is watered and turned, but not being an alluvial clay, contains no stones, and therefore does not require to be washed over. It is finally passed through the pug mill in order to temper it. The required form of a pot or pan, or any other article, is given to it on the wheel, and the ware is dried under cover till it has acquired a considerable solidity. The glaze is then put on in the state of cream, by means of a brush, care being taken to cover the whole surface as evenly as possible: for small articles, such as pipkins, that are glazed only internally, a little of the cream is poured in, and then poured out again, a sufficient quantity of the glaze adhering to the surface of the ware.

The materials of the glaze are galena, commonly called potter's lead ore, ground to an impalpable powder, and then mixed with clay diffused in water, technically called slip. This glaze is transparent, and of a pale yellow colour, and consequently shows through it the colour of the ware; if a black opaque glaze is required, one part of common manganese is added to nine parts of galena. After the glaze is laid on, the ware is again dried, and is then piled in the kiln in order to be burnt or fired. For the first twenty-four hours a very low heat is applied, in order to drive all the moisture out of the ware; it is then exposed for twenty-four hours more to a heat as high as it can bear without fusion, which has the effect of baking the clay, of driving off the sulphur from the lead ore, and of causing the oxide of lead to form a frit or imperfect glass with the clay, the other ingredient of the glaze. The fire is now fed with bavin wood instead of coal, by which the heat is increased, the furnace is filled with flame, and the frit being converted into a perfect glass, flows uniformly over the surface of the ware. The fire is then allowed to go out, and when the furnace has become cool, the contents are removed. If the air has been still during the burning, and due care has been observed, the articles in every part of the kiln will be properly baked; but a high wind always renders the heat very unequal, so that the ware in the windward part of the kiln will not be baked enough, while that in the leeward part will be over-burnt, and run to a slag.

All articles of earthenware which after being baked are opaque, are

more or less porous; and if a heat somewhat approaching to their point of fusion, so as to render them slightly translucent, cannot safely be applied, it is evident that such ware is not very proper for vessels employed in cookery, and for several other purposes, from the difficulty of keeping them clean, and from their liability to crack when set on the fire in a damp state. In England we endeavour to obviate this imperfection by means of a thick vitreous glaze; but as the ware itself is very fusible, the glaze must be still more so; and as oxide of lead forms the cheapest and most fusible glaze, this accordingly is the material universally employed by us. But there is a very serious objection to the use of this glaze, namely, that it is soluble in vinegar, in the juice of most fruits, especially when hot, and also in boiling fat; the consequence of which is, that the food of the lower classes, by whom alone cooking vessels of glazed red ware are employed, is often contaminated with lead, so as seriously to impair their health by occasioning colics, and the other usual effects of lead poison. Possibly borax, which is now a cheap article, and very fusible, might be made to supersede the use of lead; if not, the only way of avoiding this very serious hazard to health, will be the use of more refractory clay, which, consequently, would allow the employment of a less fusible glaze free from lead. This has been done by Mr. Meigh, a potter in Staffordshire, to whom the Society awarded a medal for his invention: the ware produced by him is far superior to that in common use, and well deserves the encouragement of the public. The natives of Peru, as Captain Bagnold informs me from his own personal observation, are in the habit of rendering their earthenware impermeable to water, by rubbing it, when hot, with tallow, which being partly charred, fills up the pores, and at the same time gives the ware a black colour, of which the specimens now before you are examples.

The Etruscan and Greek vases are covered by a black carbonaceous, non-vitreous varnish, which evidently wears off by long handling, and may probably have been produced by a process similar to the Peruvian. The pottery of Samos, which was in great request among the ancients, especially for cooking vessels, has a red covering, seemingly semi-vitreous. Wine and oil jars were rendered by the ancients impenetrable to moisture, as they are at present by the people of Spain and Italy, by rubbing them with wax; but for holding dry substances no glaze or varnish was required. Statues of the gods were in Rome very generally made of terra cotta, that is, of red ware, till the conquests of Sylla, Lucullus, and Pompey, by their large introduction of Greek statues of marble, changed the fashion. Other uses of red ware among the Romans were for tiles and water pipes; and Pliny states, that M. Varro and others directed that their bodies when dead should be deposited in earthenware. A species of ware, somewhat superior to our common red ware, is made at Lambeth, of Maidstone clay, being of a paler colour and a more compact texture than the latter, but does not take a uniform covering by the common glaze for red ware; it is therefore chiefly used for purposes which admit its employment in an unglazed state, or in

situations where the imperfection of the glaze is not perceived, as in ornamented chimney pots, gas consumers, &c.

A more perfect, and indeed very excellent species of earthenware, is that called stone ware, originally introduced from Holland, and now made in several parts of the kingdom, and especially at Lambeth.

The materials are, pipe-clay from Dorcetshire and Devonshire, calcined and ground flint from Staffordshire, and sand from Woolwich and Charlton.

The clay is pulverized and sifted dry, and is either used alone, when an article of great compactness is required, as soda-water bottles, or is mixed with sand to diminish its contraction in the fire. For retorts and other large vessels, instead of sand, the refuse stone ware, ground to a fine powder, is used. For the finer articles, such as figured jugs, ground flint is employed in place of sand. The composition is brought, by the addition of water, to the state of mortar, and is then tempered in the pug-mill. All round articles are made on the horizontal wheel; and those of great size, i. e. of a greater capacity than two gallons, are at first of extraordinary thickness below to support the upper part; when they come off the wheel they are dried, and then put on the wheel again, and shaved down to a proper thickness. For oval, and other figures not circular, as pans for salting hams in, the clay is formed in a mould to the required shape. The drying, especially of large articles, must be very carefully performed; and as, from custom, the tops or bottoms of jars, and various other vessels made of this ware, are required to be of a deeper brown than the natural colour of the materials, they are dipped in a mixture of red ochre and clay slip. When perfectly dry they are piled in the furnace, bits of well sanded clay being put between each piece to prevent them from adhering. A slow fire is kept up for twelve to twenty-four hours, according to the thickness of the ware, capable of bringing it just to a low red heat. The fire is then to be raised till the flame and the ware are of the same colour, and is so to be continued for several hours. At this time the glaze is added, which is done by pouring down the holes in the top of the kiln, twenty or thirty in number, ladles-full of common salt. This, being volatilized by the intense heat of the interior, attaches itself to the outer surface of the ware: here it is decomposed, the muriatic acid flying off, and the soda remaining behind in union with the earth, with which it forms a very thin, but, on the whole, a perfect glaze; at least quite sufficient, with the compactness of the ware, to render it completely proof against the percolation, not only of water, but of the strongest acids. So perfect, indeed, is the texture of the best ware now made, that it has of late been very largely used in the construction of distillatory vessels for manufacturing chemists, instead of green glass, as being more durable, and also cheaper. Pickling jars, and many other vessels in which acid substances for food or condiment are kept, as also those earthen vessels in which great strength is required, are best made of stone ware. Vauxhall is the chief seat of this manufacture.

[TO BE CONTINUED.]

New African Expedition.

The most interesting armament ever despatched from the shores of Britain, has just been equipped at the expense of a few princely merchants of Liverpool. Its objects are to explore and open a commercial intercourse with the heart of Africa by means of the mighty waters of the Niger.

The public are aware that Richard Lander, an obscure and uneducated, but enterprising and intelligent Cornish servant of Captain Clapperton, recently ascertained that the Niger below Boussa, after wandering for four or five hundred miles through the heart of Western Africa, and receiving the contributions of many navigable streams, empties itself into the ocean by several embouchures in that immense bay of the Atlantic called the Gulf of Guinea. The Nun River, by which Lander and his brother descended to the sea, disembogues its waters near Cape Formoso, a promontory separating the Bight of Biafra from the Bight of Benin. From our settlement at Fernando Po, to the Nun river does not exceed 150 miles, so that the importance of our obtaining a footing upon that island is manifest; for, in all probability, the Nun is the principal embouchure of the Niger, though this point is not yet decided. Thus much, however, appears certain, that, entering up this channel, the Niger is navigable for the whole 400 or 500 miles between Boussa and the sea; that though above Boussa the channel is obstructed by a barrier of rocks, yet little doubt exists of its having a communication with Timbuctoo; and, which is of greater consequence in a commercial point of view, that throughout its whole majestic course, the Niger rolls through a fruitful, cultivated, and thickly populated country, studded with towns and villages hitherto unvisited by Europeans, and having no other trade with civilized nations than such imperfect barter as could be carried on across burning deserts, by the agency of slave dealers, and periodical caravans. What a field is here displayed for mercantile adventure! What an opening for extending the trade of Great Britain! What a market for our languishing manufactures! What a means of striking at the heart of the slave trade by introducing civilization and industry across the very route of the principal Caffilas! What a harvest for geographical and other science, in exploring the Niger and its tributary streams! What an opportunity for our missionaries to spread the light of the gospel in the focus of idolatry and superstition! What a glorious chance of converting myriads of heathen nations; and of substituting for ignorance, cruelty, and barbarism, the blessed doctrines of peace, good will, and eternal salvation!

It is with prospects like these, and with a view to secure the advantages in question for our own country, that proposals were made to his majesty's government to take immediate possession of Lander's newly-discovered river. Why this project was not eagerly adopted it is difficult to determine. Finding no disposition on the part of government to assist in appropriating the commerce of Africa,

Mr. Laird, and some other merchants of Liverpool, determined to fit out an expedition at their own expense; and so little encouragement did they receive, that the treasury actually refused to permit the vessels on their return, to land their cargoes duty free. Yet no sooner had Mr. Laird, jr. accomplished the equipment of his squadron, than the Admiralty requested permission to send out a surveyor of their own to take observations, determining latitudes, longitudes, &c. Fortunately for the nation at large, Mr. Laird did not object to this appointment, and Lieutenant Allen, R. N., was selected by the Admiralty hydrographer; an officer whose conciliatory, amiable, and gentlemanly manners, soon secured him the personal regard of Mr. Laird, and of every person on board. Every thing being at length prepared, and Mr. Lander having promised to accompany the expedition, the vessels composing it assembled at Milford Haven as follows:—

Quorra, steam vessel. Having on board Mr. Laird, jr., of Liverpool, as director and supercargo of the squadron.

Sailing Commander, Mr. Harries, Master of the Royal Navy, an officer well acquainted with the coast of Africa.

Lieut. Allen, Surveyor, furnished with numerous instruments for observing the dip, latitudes, longitudes, &c.

Richard Lander, African traveller, and discoverer of the termination of the Niger, acting as guide, adviser, and partly as interpreter to the expedition.

Also, a gentleman of ability, who has volunteered to accompany the expedition as surgeon and naturalist.

The Quorra is 115 feet in length over all; breadth of beam sixteen feet; depth of hold, eight feet; draught of water, with every thing on board for ascending the niger, four feet two inches; tonnage 146, including the engine room. One engine of forty horse power, to be used only in calms, and in ascending rivers. Constructed to burn either coal or wood, as may be required.

Alburkah. So called from an African expression signifying *blessing*. A small steam vessel, built entirely of iron, by Mr. Macgregor Laird, director of the expedition. Fitted with one steam engine of fifteen horse power, constructed to burn wood or coal. Vessel seventy feet in length over all; breadth of beam, thirteen feet two inches; depth of hold, six and a half feet; draught of water when launched only nine inches. With engine in and boiler full, drew two feet six inches; drew four feet six inches on leaving Milford Haven, having provisions and water for twelve men for fifty days, besides ten tons of coal. Bottom of the vessel one-fourth of an inch thick; sides, one-twelfth inch thick. Gross weight when built, and wooden decks laid, sixteen tons, tonnage fifty-six, including engine room. Schooner rigged, like the Quorra. Commanded by Mr. Joseph Hill.

N. B. The greatest interest has been excited about this diminutive vessel, as it is certainly a bold undertaking to navigate the Atlantic in so small a boat, built entirely of iron! She is intended to explore the Tschadda, and other tributary streams of the Niger.

Columbine. Merchant brig of 176 tons. Commanded by Mr.

Miller. This vessel conveys a considerable quantity of coal, and a curious investment of goods for trading with the natives. Her bill of lading would, indeed, have furnished a most ludicrous assortment of articles, from a penny whistle to a kingly crown!

Armament.

Quorra	-	24 pounder swivel-gun,	1
		18 do. do.	1
		4 do.	8
Alburkah	-	9 do. swivel-gun,	1
		Swivels, - -	6
Columbine,	-	6 pounder carronades,	4
		Total,	21 guns.

Besides musquetoons, firelocks, boarding pikes, cutlasses, pistols, &c.

The expedition was detained at Milford several days, waiting the arrival of Mr. Lander, but as the wind blew steadily at north on the 24th of July, Mr. Laird despatched the Columbine and Alburkah for Port Prayah, in the Cape de Verds, that being the first place of rendezvous. A day or two after Mr. Lander arrived, in a fishing boat from Ilfracombe, and in an hour the Quorra put to sea, bearing with her the hearty good wishes of every spectator.

It is Mr. Laird's intention to proceed, in the first instance, to Port Prayah, where he hopes to meet with the commander-in-chief of the African station, who has orders to render him assistance. From thence they go to Cape Coast to take on board some Kroomen negroes, to cut wood in going up the Niger, and dash on at once to Boussa, opening communications for a trade in gold dust, palm oil, and ivory, by the way. The Alburkah will explore meanwhile all the principal tributaries of the Niger, and it is not altogether beyond possibility but she may find a way through the Tcshadda, Shary, or some other river, into lake Tschad, in the centre of the African continent; nay, some flatter themselves with the dream of being able to penetrate into Abysinia, and the Red Sea, by rivers running out of lake Tschad in an easterly direction. What would be the astonishment of the good people of Bombay should this cockle-shell of a vessel—not larger than the boiler of Whitbread's brewery—and built of iron, force her way through the centre of Africa, and so on by the Red Sea, and straits of Bable Mandle, to Socotra, and the coast of Malabar! Let this vision terminate as it may, the attempt deserves success; and that the whole of the spirited individuals by whom it has been undertaken may be rewarded by the fullest realization of their most sanguine hopes, is the sincere prayer of one who with difficulty restrained the desire to quit wife, family, and friends, to embark with the wanderers composing the African expedition.

[*United Service Journal for September.*

Teasel.

The present season has been the most productive in this important article of produce in the west of England ever remembered; and the crops have been harvested in the best possible condition.

The teasel, a species of thistle, (*disacus carduus fullonum*) is propagated by sowing the seeds in March, upon a well prepared soil. About one peck of seed is sufficient for an acre, as the plants must have room to grow, otherwise the heads will not be large enough, nor in great quantity. When the plants come up they must be hoed in the same manner as is practiced for turnips, cutting down all the weeds, and thinning the plants to about eight inches distant, and as they advance, and the weeds begin to grow again, they must be hoed a second time, cutting out the plants to a wider distance, so that they may finally stand a foot apart. The second year they will shoot up heads, which may be cut about the beginning of August. They are then to be tied up in bunches, and set in the sun, if the weather be fair; or if not, in rooms to dry. The common produce is about one hundred and sixty bundles or staffs per acre.

In Essex, the seeds of the teasel, caraway, and coriander, are sometimes sown together early in the spring: the mode of cultivation is rather singular—the farmer engaging with some labourer to share equal profits, the former provides the land, ploughs it, pays all parish rates, and also for the seed; the latter sows it, keeps it clean by frequent hoeings, cuts, threshes, and prepares it for the market. This connexion generally lasts three years, sometimes longer. Mr. Griggs informs us, in his "General View of the Agriculture of Essex," that "in the first year the several seeds come up, and when of sufficient growth are set out with a hoe; and the coriander, which is annual, is ripe before harvest, and produces a return from ten to fourteen hundred weight an acre; in the second year the teasel, most of which will run now, yields a load, or six score staffs, of fifty heads each staff; and the caraways from three to six hundred weight of seed: the third year the teasel declines, and the caraway is in perfection, and will yield an equal bulk with the coriander, and most of the teasel that did not run last season, will produce heads this, and afford a fourth or fifth part of the crop it did the preceding season, by which time the plants are generally exhausted, though a fourth and even a fifth year of caraway, has been known to succeed."

The coriander and caraway must be handled with great care when ripe. Women and children are generally employed to cut it plant by plant, which are afterwards placed in cloths, and commonly threshed on sail cloth in the field. The teasel is also cut by women, who leave a stalk with the head five or six inches in length, by which it is bound in bunches, or gleans, of twenty-five heads each. Fifty gleans make one staff.

The teasel is of singular use in raising the nap upon woollen cloth. For this purpose the heads are fixed round a large broad wheel, which is made to revolve, two men holding the teasel frame, as it is called,

and work the cloth as it hangs up in a vertical position, drawing it down in portions as they proceed. The whole forms an instrument resembling a currycomb, and which is used in a similar manner to draw out all loose ends of the fibres of the wool. [*Rep. Pat. Inv.**

Roofs.

Sheet iron coverings are now universally made use of on all new buildings in Petersburg, Moscow, &c. In the case of a fire no harm can come to a house from sparks falling on a roof of this description. The sheets of this iron covering measure two feet four inches wide by four feet eight inches long, and weigh twelve and a half pounds avoirdupois per sheet, or one pound five ounces each superficial square foot. When the sheets are on the roof, they measure only two feet wide by four feet in length; this is owing to the overlapping. They are first painted on both sides once, and when fixed on the roof, a second coat is given. The common colour is red; but green paint, it is said, will stand twice the time. Small bits or ears are introduced into the laps for nailing the plates on the two inch square laths on which they are secured.

It takes twelve and a half sheets to cover 100 feet, the weight of which is only 150 lbs.; the cost only 35*s*, or about 3*d* per foot.

[*Ibid.*

Progress of Civilization in Egypt.

In Egypt an experiment has lately been made, which will probably have very important effects on the civilization of Egypt and Arabia. Two labouring men, who we believe had been employed near London in boring for water, were taken to Egypt by Mr. Brigs, who was at one time consul at Cairo. They were employed under the patronage of the Pacha, to bore for water in the Desert. At about thirty feet below the surface they found a stratum of sand stone; when they got through that, an abundant supply of water was procured.

The water usually obtained from the surface is of an inferior quality, and for many purposes useless; that which has been obtained by boring is soft and pure. We believe that the experiment has succeeded at every place where it has been made. Already, in the Desert of Suez, a tank, capable of holding 2000 cubic feet of water, had been made, and it is probable that by this time several others have been formed. By this discovery, one great impediment to the fertilizing of this country will be removed. [*Ibid.*

* We have no objection to the use, by the editor of the work just quoted, of our descriptions of patents, or other original articles, or of our translations; but we expect, and require, to have the source from which they are derived acknowledged.—Com. Pub.

¶ Popular Science.

No. II.

Selections from Letters on Natural Magic.

By Sir David Brewster.*

(Continued from p. 144.)

Spectral Illusions.

A few years ago I had occasion to spend some days under the same roof with the lady to whose case I refer. At that time she had seen no spectral illusions, and was acquainted with the subject only from the interesting volume of Dr. Hibbert. In conversing with her about the cause of these apparitions, I mentioned, that if she should ever see such a thing, she might distinguish a genuine ghost existing externally, and seen as an external object, from one created by the mind, by merely pressing one eye, or straining them both so as to see objects double; for in this case, the external object or supposed apparition would invariably be doubled, while the impression on the retina created by the mind would remain single. This observation recurred to her mind when she unfortunately became subject to the same illusions; but she was too well acquainted with their nature to require any such evidence of their mental origin; and the state of agitation which generally accompanies them seems to have prevented her from making the experiment as a matter of curiosity.

1. The first illusion to which Mrs. A. was subject, was one which affected only the ear. On the 26th of December, 1830, about half-past four in the afternoon, she was standing near the fire in the hall, and on the point of going up stairs to dress, when she heard, as she supposed, her husband's voice calling her by name, "—— —— come here! come to me!" She imagined that he was calling at the door to have it opened, but upon going there and opening the door, she was surprised to find no person there. Upon returning to the fire, she again heard the same voice calling out very distinctly and loudly, "—— —— come, come here!" She then opened two other doors of the same room, and upon seeing no person she returned to the fireplace. After a few moments she heard the same voice still calling, "—— —— come to me, come! come away!" in a loud, plaintive, and somewhat impatient tone. She answered as loudly, "Where are you? I don't know where you are;" still imagining that he was somewhere in search of her: but receiving no answer, she shortly went up stairs. On Mr. A.'s return to the house, about half an hour afterwards, she inquired why he called to her so often, and where he was; and she was of course greatly surprised to learn that he had not been near the house at the time. A similar illusion, which excited no particular notice at the time, occurred to Mrs. A. when residing at Florence about ten years before, and when she was in perfect health. When she was undressing after a ball, she heard a

* American edition: published by J. & J. Harper, New York.

voice call her repeatedly by name, and she was at that time unable to account for it.

2. The next illusion which occurred to Mrs. A. was of a more alarming character. On the 30th of December, about four o'clock in the afternoon, Mrs. A. came down stairs into the drawing room, which she had quitted only a few minutes before, and on entering the room she saw her husband, as she supposed, standing with his back to the fire. As he had gone out to take a walk about half an hour before, she was surprised to see him there, and asked him why he had returned so soon. The figure looked fixedly at her with a serious and thoughtful expression of countenance, but did not speak. Supposing that his mind was absorbed in thought, she sat down in an arm-chair near the fire, and within two feet at most of the figure, which she still saw standing before her. As its eyes, however, still continued to be fixed upon her, she said, after the lapse of a few minutes, "Why don't you speak, ——?" The figure immediately moved off towards the window at the farther end of the room, with its eyes still gazing on her, and it passed so very close to her in doing so, that she was struck by the circumstance of hearing no step nor sound, nor feeling her clothes brushed against, nor even any agitation in the air. Although she was now convinced that the figure was not her husband, yet she never for a moment supposed that it was any thing supernatural, and was soon convinced that it was a spectral illusion. As soon as this conviction had established itself in her mind she recollected the experiment which I had suggested, of trying to double the object; but before she was able distinctly to do this, the figure had retreated to the window, where it disappeared. Mrs. A. immediately followed it, shook the curtains and examined the window, the impression having been so distinct and forcible that she was unwilling to believe that it was not a reality. Finding, however, that the figure had no natural means of escape, she was convinced that she had seen a spectral apparition like those recorded in Dr. Hibbert's work, and she consequently felt no alarm or agitation. The appearance was seen in bright daylight, and lasted four or five minutes. When the figure stood close to her it concealed the real objects behind it, and the apparition was fully as vivid as the reality.

3. On these two occasions Mrs. A. was alone, but when the next phantasm appeared, her husband was present. This took place on the 4th of January, 1831. About ten o'clock at night, when Mr. and Mrs. A. were sitting in the drawing room, Mr. A. took up the poker to stir the fire, and when he was in the act of doing this, Mrs. A. exclaimed, "Why there's the cat in the room!" "Where?" asked Mr. A. "There, close to you," she replied. "Where?" he repeated. "Why on the rug, to be sure, between yourself and the coal-scuttle." Mr. A. who had still the poker in his hand, pushed it in the direction mentioned; "Take care," cried Mrs. A., "take care, you are hitting her with the poker." Mr. A. again asked her to point out exactly where she saw the cat. She replied, "Why sitting up there close to your feet on the rug: she is looking at me. It is Kitty—come here Kitty?" There were two cats in the house, one of which went by this name, and they were rarely if ever in the draw-

ing-room. At this time Mrs. A. had no idea that the sight of the cat was an illusion. When she was asked to touch it, she got up for the purpose, and seemed as if she were pursuing something which moved away. She followed a few steps, and then said, "It has gone under the chair." Mr. A. assured her it was an illusion, but she would not believe it. He then lifted up the chair, and Mrs. A. saw nothing more of it. The room was then searched all over, and nothing found in it. There was a dog lying on the hearth, who would have betrayed great uneasiness if a cat had been in the room, but he lay perfectly quiet. In order to be quite certain, Mr. A. rung the bell, and sent for the two cats, both of which were found in the housekeeper's room.

4. About a month after this occurrence, Mrs. A. who had taken a somewhat fatiguing drive during the day, was preparing to go to bed about eleven o'clock at night, and, sitting before the dressing glass, was occupied in arranging her hair. She was in a listless and drowsy state of mind, but fully awake. When her fingers were in active motion among the papillotes, she was suddenly startled by seeing in the mirror the figure of a near relation, who was then in Scotland, and in perfect health. The apparition appeared over her left shoulder, and its eyes met hers in the glass. It was enveloped in grave clothes, closely pinned, as is usual with corpses, round the head and under the chin, and though the eyes were open, the features were solemn and rigid. The dress was evidently a shroud, as Mrs. A. remarked even the punctured pattern usually worked in a peculiar manner round the edges of that garment. Mrs. A. described herself as at the time sensible of a feeling like what we conceive of fascination, compelling her for a time to gaze on this melancholy apparition, which was as distinct and vivid as any reflected reality could be, the light of the candles upon the dressing table appearing to shine fully upon its face. After a few minutes, she turned round to look for the reality of the form over her shoulder, but it was not visible, and it had also disappeared from the glass when she looked again in that direction.

5. In the beginning of March, when Mr. A. had been about a fortnight from home, Mrs. A. frequently heard him moving near her. Nearly every night as she lay awake she distinctly heard sounds like his breathing hard on the pillow by her side, and other sounds such as he might make whilst turning in bed.

7. On the 17th March, Mrs. A. was preparing for bed. She had dismissed her maid, and was sitting with her feet in hot water. Having an excellent memory, she had been thinking upon and repeating to herself a striking passage in the Edinburgh Review, when, on raising her eyes, she saw seated in a large easy chair before her the figure of a deceased friend, the sister of Mr. A. The figure was dressed as had been usual with her, with great neatness, but in a gown of a peculiar kind, such as Mrs. A. had never seen her wear, but exactly such as had been described to her by a common friend as having been worn by Mr. A.'s sister during her last visit to England. Mrs. A. paid particular attention to the dress, air, and appearance of the figure, which sat in an easy attitude in the chair, holding a

handkerchief in one hand. Mrs. A. tried to speak to it, but experienced a difficulty in doing so, and in about three minutes the figure disappeared. About a minute afterward, Mr. A. came into the room, and found Mrs. A. slightly nervous, but fully aware of the delusive nature of the apparition. She described it as having all the colouring and apparent reality of life; and for some hours preceding this and other visions she experienced a peculiar sensation in her eyes, which seemed to be relieved when the vision had ceased.

8. On the 5th October, between one and two o'clock in the morning, Mr. A. was awoke by Mrs. A., who told him that she had just seen the figure of his deceased mother draw aside the bed curtains and appear between them. The dress and the look of the apparition were precisely those in which Mr. A.'s mother had been last seen by Mrs. A. at Paris, in 1824.

9. On the 11th October, when sitting in the drawing room, on one side of the fire-place, she saw the figure of another deceased friend, moving towards her from the window at the farther end of the room. It approached the fireplace, and sat down in the chair opposite. As there were several persons in the room at the time, she describes the idea uppermost in her mind to have been a fear lest they should be alarmed at her staring, in the way she was conscious of doing, at vacancy, and should fancy her intellect disordered. Under the influence of this fear, and recollecting a story of a similar effect in Sir Walter Scott's work on Demonology, which she had lately read, she summoned up the requisite resolution to enable her to cross the space before the fire-place, and seat herself in the same chair with the figure. The apparition remained perfectly distinct till she sat down, as it were, in its lap, when it vanished.

10. On the 26th of the same month, about two P. M., Mrs. A. was sitting in a chair by the window in the same room with her husband. He heard her exclaim, "What have I seen!" and on looking at her, he observed a strange expression in her eyes and countenance. A carriage and four had appeared to her to be driving up the entrance road to the house. As it approached she felt inclined to go up stairs to prepare to receive company, but, as if spell-bound, she was unable to move or speak. The carriage approached, and as it arrived within a few yards of the window, she saw the figures of the postillions and the persons inside take the ghastly appearance of skeletons and other hideous figures. The whole then vanished entirely, when she uttered the above-mentioned exclamation.

12. On the 3d December, about nine, P. M. when Mr. and Mrs. A. were sitting near each other in the drawing room occupied in reading, Mr. A. felt a pressure on his foot. On looking up, he observed Mrs. A.'s eyes fixed with a strong and unnatural stare on a chair about nine or ten feet distant. Upon asking her what she saw, the expression of her countenance changed, and upon recovering herself, she told Mr. A. she had seen his brother, who was alive and well at the moment in London, seated in the opposite chair, but dressed in grave-clothes, and with a ghastly countenance, as if scarcely alive.

Such is a brief account of the various spectral illusions observed

by Mrs. A. In describing them I have used the very words employed by her husband in his communications to me on the subject;* and the reader may be assured that the descriptions are neither heightened by fancy, nor amplified by invention. The high character and intelligence of the lady, and the station of her husband in society, and as a man of learning and science, would authenticate the most marvellous narrative, and satisfy the most scrupulous mind, that the case has been philosophically, as well as faithfully, described. In narrating events which we regard as of a supernatural character, the mind has a strong tendency to give more prominence to what appears to itself the most wonderful; but from the very same cause, when we describe extraordinary and inexplicable phenomena which we believe to be the result of natural causes, the mind is prone to strip them of their most marvellous points, and bring them down to the level of ordinary events. From the very commencement of the spectral illusions seen by Mrs. A. both she and her husband were well aware of their nature and origin, and both of them paid the most minute attention to the circumstances which accompanied them, not only with the view of throwing light upon so curious a subject, but for the purpose of ascertaining their connexion with the state of health under which they appeared.

As the spectres seen by Nicolai and others had their origin in bodily indisposition, it becomes interesting to learn the state of Mrs. A.'s health when she was under the influence of these illusions. During the six weeks within which the three first illusions took place, she had been considerably reduced and weakened by a troublesome cough, and the weakness which this occasioned was increased by her being prevented from taking a daily tonic. Her general health has not been strong, and long experience has put it beyond a doubt, that her indisposition arises from a disordered state of the digestive organs. Mrs. A. has naturally a morbidly sensitive imagination, which so painfully affects her corporeal impressions, that the account of any person having suffered severe pain by accident or otherwise, occasionally produces acute twinges of pain in corresponding parts of her person. The account, for example, of the amputation of an arm will produce an instantaneous and severe sense of pain in her own arm. She is subject to talk in her sleep with great fluency, to repeat long passages of poetry, particularly when she is unwell, and even to cap verses for half an hour together, never failing to quote lines beginning with the final letter of the preceding one, till her memory is exhausted.

Although it is not probable that we shall ever be able to understand the actual manner in which a person of sound mind beholds spectral apparitions in the broad light of day, yet we may arrive at such a degree of knowledge on the subject as to satisfy rational curiosity, and to strip the phenomena of every attribute of the marvellous. Even the vision of natural objects presents to us insurmountable difficulties, if we seek to understand the precise part which

* Edinburgh Journal of Science, New Series, No. iv. p. 218, 219; No. vi. p. 44; and No. viii. p. 261.

the mind performs in perceiving them; but the philosopher considers that he has given a satisfactory explanation of vision when he demonstrates that distinct pictures of external objects are painted on the retina, and that this membrane communicates with the brain by means of nerves of the same substance as itself, and of which it is merely an expansion. Here we reach the gulf which human intelligence cannot pass; and if the presumptuous mind of man shall dare to extend its speculations further, it will do it only to evince its incapacity and mortify its pride.

In his admirable work on this subject, Dr. Hibbert has shown that spectral apparitions are nothing more than ideas, or the recollected images of the mind, which in certain states of bodily indisposition have been rendered more vivid than actual impressions; or to use other words, that the pictures in the "mind's eye" are more vivid than the pictures in the body's eye. This principle has been placed by Dr. Hibbert beyond the reach of doubt; but I propose to go much further, and to show that the "mind's eye" is actually the body's eye, and that the retina is the common tablet on which both classes of impressions are painted, and by means of which they receive their visual existence according to the same optical laws. Nor is this true merely in the case of spectral illusions: it holds good of all ideas recalled by the memory or created by the imagination, and may be regarded as a fundamental law in the science of pneumatology.

[TO BE CONTINUED.]

NOTICE.

Proposed Work on M'Adamized Roads.

Mr. JOHN S. WILLIAMS, *Engineer*, of Cincinnati, Ohio, has issued proposals for publishing "A practical treatise on M'Adamized roads; together with general observations on the best modes of making and improving other roads."

The work is to contain at least 450 pages, octavo, and to be illustrated by about one hundred drawings, and to be delivered to subscribers at three dollars a copy, bound. As the author cannot assume the risk of publication without such a subscription list as shall insure his safety in this particular, he requests those who are inclined to patronize the work, to send in their names, and to use their influence to induce others to do the same. The Actuary of the Institute, or the Editor of this Journal, will gladly receive and forward to Mr. Williams the names of those willing to subscribe.

The experience of Mr. Williams in the construction of M'Adamized roads has been greater, it is believed, than that of any other individual in this country. The testimonials of his ability, which accompany his prospectus, are of the most honourable character, and are given, in general, by those who have had a full opportunity to become acquainted with his capacity. Among them are the trustees of the Maysville and Lexington turnpike road, whose engineer he was for three years and a half. The president and directors of the Cincinnati, Columbus, and Wooster turnpike company, who attest to

the excellence of the M'Adamized roads, and the beauty and permanence of the bridges constructed by him for them; and other companies also, have furnished similar testimonials. Mr. J. Knight, the chief engineer of the Baltimore and Ohio rail-road, Mr C. W. Wever, the superintendent, and Mr. Andrew Steele, who was for ten years employed in Great Britain under Mr. M'Adam, speak highly of the abilities of Mr. Williams, and of the utility of the work.

The following is proposed as the probable order of treating the subject. Introduction—Road Companies—Charter—By-laws—Engineers—Mapping—Superintendents—Directors—Settings—Contracts—Masonry—Bridging—Graduation—M'Adamizing—Repairs—Tolls—Artificial Roads generally—Substitutes for Stone in the Construction of Artificial Roads—Common Roads—Street Pavements—Wharves—Landings—Ferries—Viaducts—Yards—Walks—Vehicles, &c. &c.

Meteorological Observations for January, 1833.

Moon. Days.		Therm. Sun-rise.	Therm. 2 P. M.	Barometer. Sun rise.	Barometer. 2 P. M.	Dew point	Wind. Direction.	Wind. Force.	Water fallen in rain.	State of the weather, and Remarks.
				Inches.	Inches.				Inches.	
	1	47°	53°	29.90	29.90	50°	SW.	Calm.		Rain—drizzle.
	2	34	43	.90	30.00	30	NW. SE.	do.		Clear day.
	3	35	49	.90	.90	40	SE. S.	Moderate.		Cr'dy. clr.; halo round moon.
	4	34	54	.90	.90	37	S. SW.	do.	0.2	Clear—rain in night.
	5	42	64	.00	.10	44	SW. W.	do.		Hazy—clear.
	6	40	63	29.90	.70	44	SSW.	do.		Cloudy day.
	7	42	43	.70	.85	25	NW. W.	do.		Cloudy day.
	8	34	30	.85	.85	21	SE. NE.	do.		Cloudy day.
	9	23	38	.65	.90	25	W. SW.	do.		Clear day.
	10	32	56	.60	.90	31	W.	do.		Light snow—cloudy.
	11	10	17	.45	.70	−2	W.	Blustering		Clear day.
	12	13	24	.70	.95	+6	W.	do.	0.2	Clear—flying clouds.
	13	14	32	30.10	30.00	2	WSW.	do.		Clear day.
	14	24	38	29.70	29.70	20	SSW.	do.		Clear day.
	15	18	34	30.05	30.05	1	SE.	do.	1.20	Cloudy—snow in night.
	16	41	42	29.90	29.90	28	SW.	do.		Cloudy—flying clouds.
	17	14	18	30.10	30.20	−2	W.	do.		Clear day.
	18	18	33	29.95	29.95	6	SW.	Moderate.		Clear day.
	19	30	35	.00	30.30	12	SE.	do.		Cloudy—cloudy.
	20	30	42	29.90	.10	30	SE. SW.	do.		Cloudy—hazy.
	21	29	36	.20	29.70	33	SE.	do.		Fog—foggy.
	22	29	39	.70	.70	36	SE.	do.	.14	Heavy fog—hazy—rain.
	23	33	36	.85	.85	37	SE.	Calm.		Fog—cloudy.
	24	33	36	.73	.60	37	SW.	Moderate.	0.4	Drizzle—rain and snow night
	25	31	31	.65	.75	36	W.	do.		Drizzle—cloudy
	26	32	31	.14	.14	10	W. S.	Blustering		Clear day.
	27	28	30.00	30.00	.90	18	SW.	Moderate.		Cloudy—clear.
	28	33	43	29.80	29.80	21	SW.	do.		Light clouds—lightly cloudy.
	29	24	34	30.05	30.00	16	SE.	Calm.		Cloudy—hazy.
	30	32	40	29.64	29.64	34	SW.	Moderate.		Cloudy—rain.
	31	32	36	.80	.90	32	NE.	Blustering		Rain—hail—snow.
Mean		28.71	37.64	29.83	29.89	25.3			2.62	

	Thermometer.	Barometer.
Maximum height during the month,	64. on 5th.	30.30 on 2nd and 19th.
Minimum do.	10. on 11th.	29.14 on 25th.
Mean do.	33.18	29.82